TELEDYNE LECROY
Everywhereyoulook™

SierraFC M164
Fibre Channel Protocol Analyzer

User Manual

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Teledyne LeCroy Protocol Solutions Group

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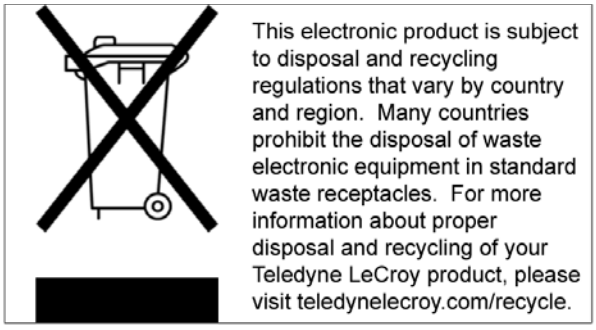
WEEE Program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Chapter 1

Introduction

This manual describes installation and operation of the Teledyne LeCroy SierraFC M164™ Fibre Channel Protocol Analyzer and includes examples of typical applications.

Figure 1.1: LeCroy SierraFC M164 Protocol Analyzer

Analyzer Overview

The SierraFC M164 Protocol Analyzer helps Hardware, Firmware, Design, and Application Engineers troubleshoot and diagnose problems within their product. The analyzer supports capturing, triggering, and filtering.

The Analyzer provides for bi-directional trigger and capture of exchanges, primitives, and patterns. You can capture all frames and/or exclude traffic.

The Analyzer has a USB port and an Ethernet port to connect to a computer. You can cascade analyzer units for higher port counts. You can trigger manually or trigger on a specific Event.

The Analyzer provides a full range of views and statistical reports.

Receiving Your Analyzer

The analyzer package includes the following components:

- ❑ SierraFC M164 Analyzer identified in the packing list
- ❑ SierraFC M164 Quick Start
- ❑ USB A-B 2.0 cable, 1.8 meter
- ❑ Ethernet cable, 10 feet
- ❑ Three-Prong AC power cord
- ❑ Rack Mount and Rack Mount Installation Guide
- ❑ Installation CD ROM with software and documentation

Unpacking the Analyzer

Inspect the received shipping container for any damage. Unpack the container and account for each of the system components listed on the accompanying packing list. Visually inspect each component for absence of damage. In the event of damage, notify the shipper and Teledyne LeCroy Corporation. Retain all shipping materials for shipper's inspection.

Analyzer Features

The Analyzer has the following features:

- ❑ Power Switch
- ❑ Trigger, Error, Link, Speed, and Frame LEDs (see next page)
- ❑ Port 1 connector
- ❑ Port 2 connector
- ❑ Port 3 connector
- ❑ Port 4 connector
- ❑ Status and Configuration LCD Display
- ❑ Configuration Buttons
- ❑ Front Panel Configuration Buttons
- ❑ External Trigger Input and Output
- ❑ USB port for host machine connectivity
- ❑ Ethernet port for network connectivity
- ❑ 19-inch Rack Mountable. Refer to the *Rack Mount Installation Guide*.

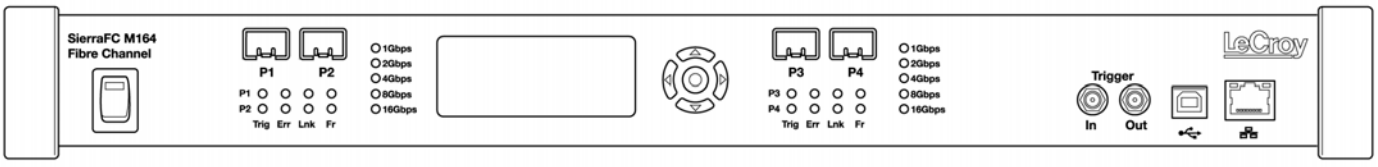


Figure 1.2: Front Panel

On the back, the Analyzer has:

- Power In
- STX SYNC Expansion Card In/Out data ports (optional)

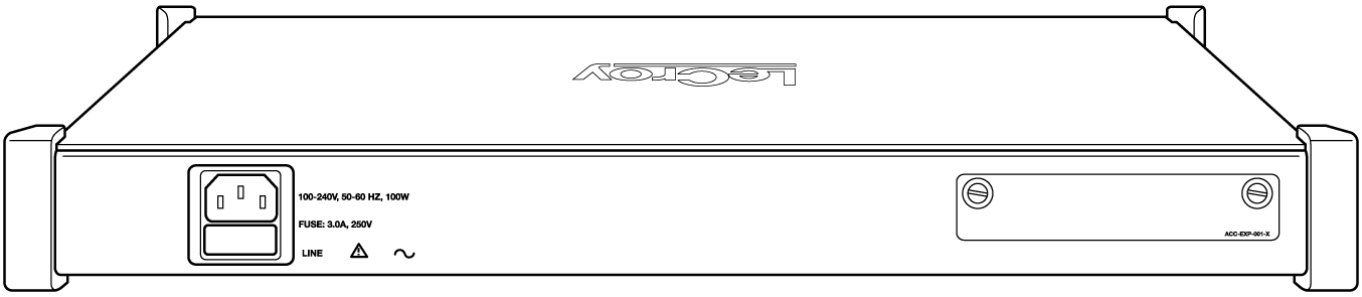


Figure 1.3: Back Panel

LEDs

LEDs support each port link, with the following functionality (refer to Figure 1.4 on page 13):

Trigger Blue Illuminates when a trigger occurs.

Error Red Illuminates when an error occurs.

Link Yellow Illuminates when a link is established.

Frame Green After the link is established, indicates traffic on the bus.

There are five LEDs on the left of the analyzer for ports P1 and P2, and five LEDs on the right of the analyzer for ports P3 and P4. These 10 LEDs indicate the speed of 1Gbps, 2Gbps, 4Gbps, 8Gbps and 16Gbps. Speed LEDs are off when there is no link (see the following figure and Figure 1.2 on page 12).

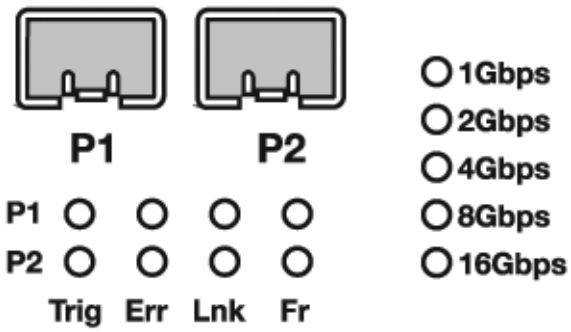


Figure 1.4: LEDs on the Left Front Panel

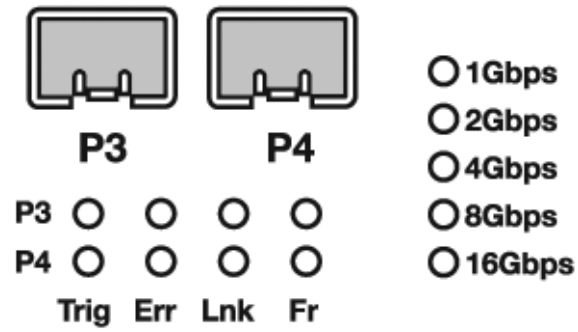


Figure 1.5: LEDs on the Right Front Panel

Status and Configuration Display

The Analyzer front LCD display indicates the configuration and status of operations. For example, during initialization, the LCD panel displays boot status messages.

LCD Display and Button Functions for Configuring the Analyzer

The SierraFC M164 can be configured from the unit itself. Five buttons are provided to enable you to configure the Analyzer. When you first turn on the Analyzer, after initialization, the LCD displays **SierraFC_M164 Available** with two arrows pointing up and down as shown in the illustration below.

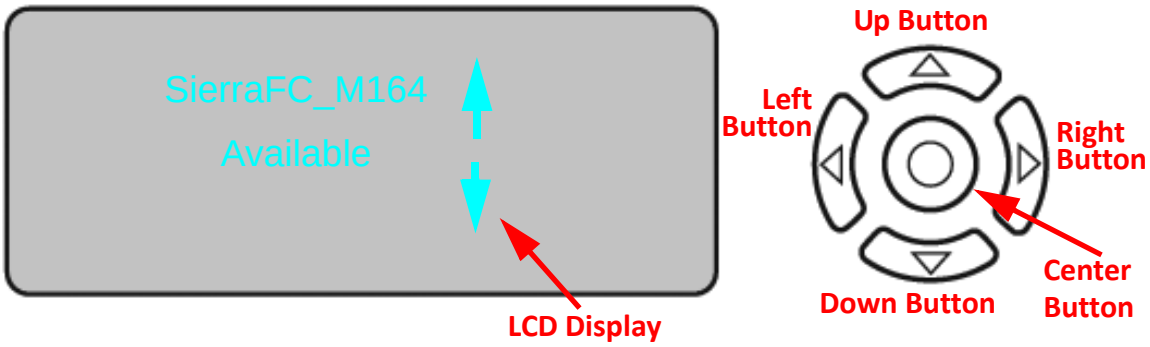


Figure 1.6: LCD Display and Button on the Front Panel

When connected via ethernet or USB, the **Up** ⇑ and **Down** ⇓ buttons display the following:

- Static or Dynamic IP Address
- SierraFC_ M164 SN
- Connection
- Unit Name
- Set IP Configuration
- IP Mode Dynamic, or
- IP Mode Static

The **Left** ⟸ and **Right** ⟹ buttons are used to change the configuration properties.

The LCD will display **Button Inactive In This MenuItem** if the button does not serve any purpose for that selection.

Perform the following steps to set IP Configuration, Static on Dynamic IP using the buttons and the LCD display on the Analyzer:

Set IP Configuration

To set IP Configuration:

1. Press the **Up Button** once to get into the **Set IP Configuration** mode.
2. Press the **Center Button** once to select Set IP Configuration**.**

   Set IP Mode Static is displayed in the LCD display. If you do not want to set IP Mode Static, press the **Up Button** to set the IP Mode Dynamic, see “IPMode Dynamic” on page 15).
3. Press the **Center Button** once to select Set IP Mode Static**.**

   The **Static IP** address (for example: 188.168.040.036) is displayed in the LCD display.
4. Press the **Center Button** once to set the Static IP address**.**

   The first numeral of the IP address will start blinking.
5. Use the **Up Button** or **Down Button** to change the IP Address.
6. Press the **Right Button** or **Left Button** to move to the right or left to change each component of the static or dynamic IP address and change it using step 5.
7. Once the IP Address is set, press the center button to select it.
8. Press the **Up Button** once to **Accept and Reboot**.
9. Press the **Up Button** once **Cancel** the Changes.
10. Press the **Up Button** once to set the **Gateway** address. Repeat steps 4 through 9 to set the Gateway address.
11. Press the **Up Button** once to set the **Subnet Mask** address. Repeat steps 4 through 9 to set the Subnet Mask address.
12. Press the **Up Button** once to set the **Static IP** address. Repeat steps 4 through 9 to set the Static IP address.
13. Press the **Center Button** once to confirm reboot. The LCD display will read **Center Button to Confirm Reboot.**
14. The Analyzer will reboot. The LCD display will display the new IP Configuration.

IPMode Dynamic

Perform the following steps to set IP Mode Dynamic on the Analyzer:

1. Press the **Up Button** once to get into the **Set IP Configuration** mode.
2. Press the **Center Button** once to select Set IP Configuration**.**

   Set IP Mode Dynamic is displayed in the LCD display.
3. Press the **Center Button** once to select Set IP Mode Dynamic**.**

   The **Dynamic IP** address (for example: 188.168.040.036) is displayed in the LCD display.

4. Press the **Center Button** to select it.
5. Press the **Up Button** once to **Accept and Reboot**.
6. Press the **Up Button** once **Cancel the Changes**.

Installing Your Analyzer

Software Installation

The software works on systems using the Windows® XP, Windows Vista, Windows Server 2003, 2008 and Windows 7 operating systems.

1. Insert the Installation CD-ROM into the CD drive on the host machine.
2. The installation automatically starts setup, unless Auto Run is off. In that case, select the CD-ROM from “My Computer” and click **Setup**.
3. After the warning to close all other programs and before starting the installation, the Install component selection opens.
4. Select components for installation.
5. Click **Next** to complete the installation.

System restart

You must restart your computer before you can use your Analyzer software.

Error Message

If you get an error message during installation of the drivers for Window, consult your system administrator. Your system may allow only administrator-level users to copy such driver files.

Hardware Setup

The hardware setup is described below.

Connecting in General

Note: You must install the software before connecting the analyzer to the host machine for the first time.

To set up the analyzer:

1. Connect the analyzer to a 100V–240V, 50Hz–60Hz, power outlet and turn on the Power switch.
   At power on, the analyzer will go through initialization as shown on the LCD display.
2. Connect the USB cable between the SierraFC M164 USB port and a USB port on the host machine. The host machine operating system detects the analyzer and driver files.
   (See “Connecting via Ethernet” on page 26 for Ethernet connectivity.)
3. Connect the analyzer as shown in the following figure. The figure shows one possible connection from an Initiator to a hard drive.

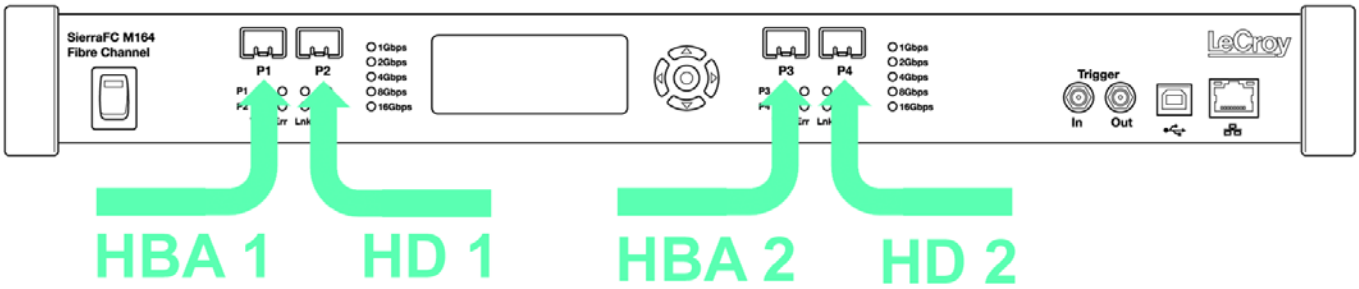


Figure 1.7: Analyzer Connections

Cables to Use

Connect from Hard Drives using SFP and a cable suitable for your setup.

Connect from Initiators using SFP and a cable suitable for your setup.

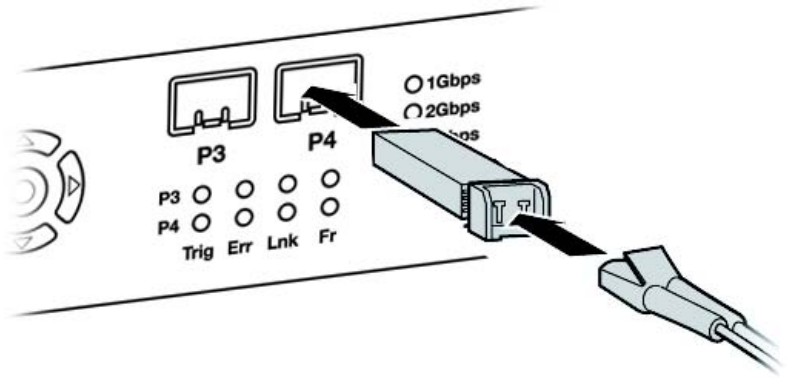


Figure 1.8: Analyzer Connections

Expandability

You can expand by:

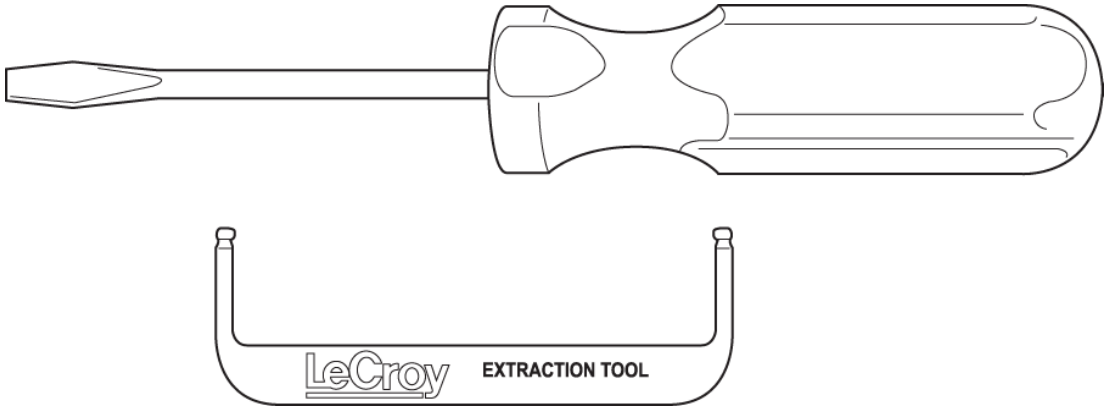
- Cascading with CATC SYNC Expansion Cards
- Using the Power Expansion Card (optional)

You can remove expansion cards with two simple tools.

Removing Expansion Cards

You can remove expansion cards using two tools:

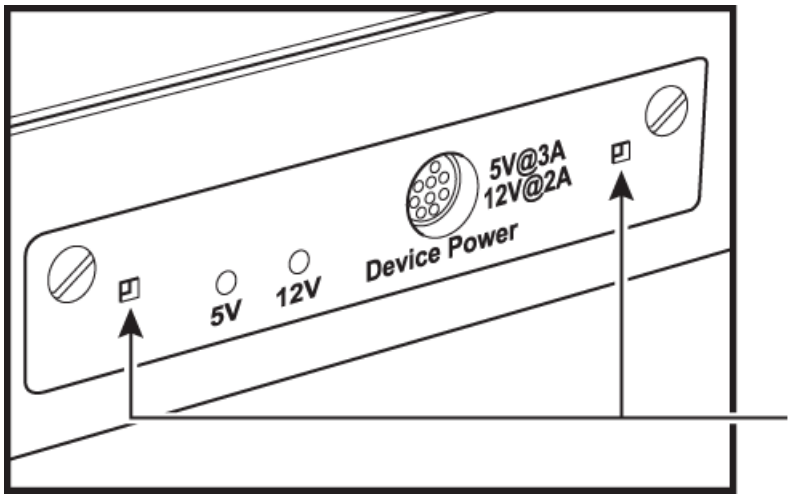
- Standard (flat blade) 3/16” screwdriver
- Teledyne LeCroy Extraction Tool (part number 230-0160-00



To remove an expansion card, follow these steps:

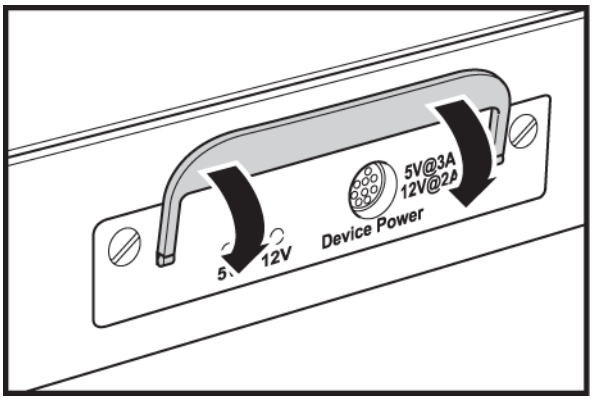
1. Unplug the system from AC power and turn the system so the expansion port is facing you. Note the two retaining screws and the holes for the extraction tool that are located on the panel of the expansion card.

Note: The SierraFC M164 Protocol Analyzer does not support the power expansion card. The method of inserting other expansion cards is the same.

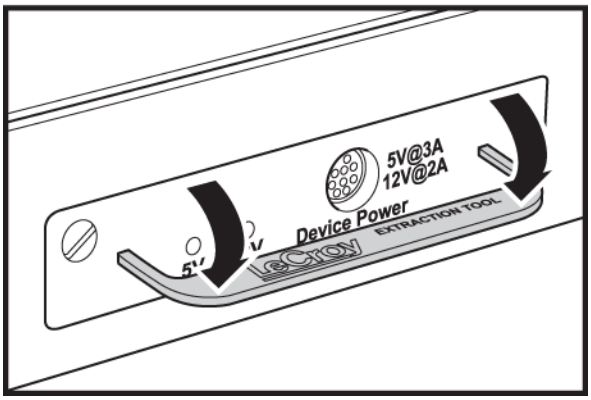


2. Insert the extraction-tool prongs into the holes in the expansion card panel.

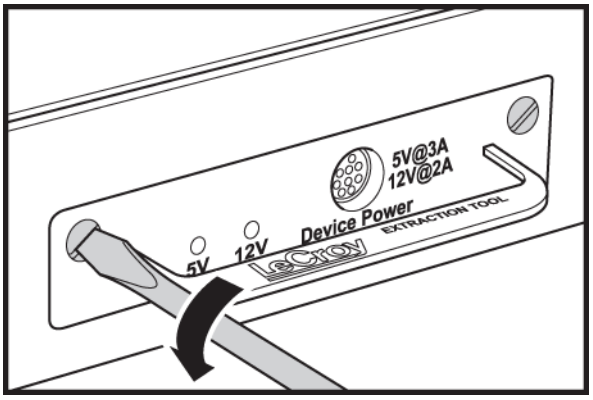
Note: If the prongs do not slip easily into the holes, use a small nail file or similar device to remove paint from the prongs



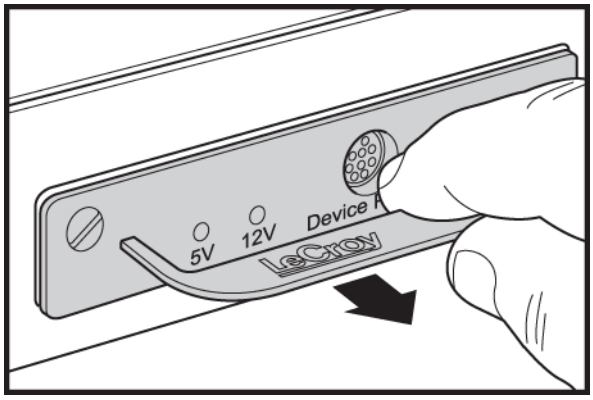
3. Rotate the extraction tool to a horizontal position to lock the prongs into place and make a handle



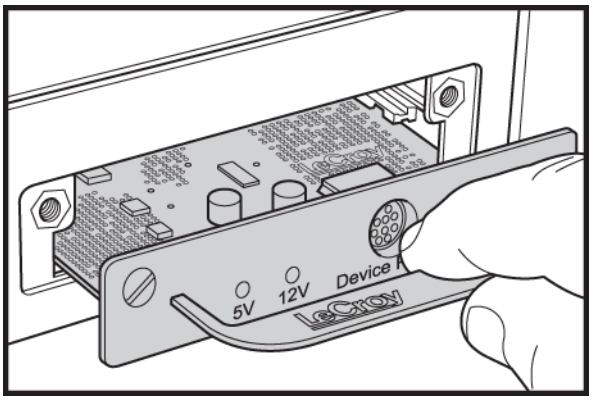
4. Using the screwdriver, loosen both retaining screws by rotating them counter-clockwise approximately two full turns, until feeling slight resistance. **Do not force the retaining screws** after two turns.



5. Using the extraction tool as a handle, gently wriggle the expansion card forward about 1⁄8”.



6. Repeat steps 4 and 5 approximately three times, until the card is free from the retaining screws and you can remove the card from the system.



Cascading with CATC SYNC Expansion

You can use cascading of analyzer units for higher port count, by connecting the units through the optional CATC SYNC Expansion Card on the analyzer back.

Connecting a SierraFC M164 and a Summit T3-16 via the CATC Sync Expansion Card (ACC-EXP-002-X)

A SierraFC M164 and a PCIe Summit T3-16 are connected using their CATC Sync ports which require an optional expansion card (ACC-EXP-002-X).

Note: Refer to relevant protocol analyzer user manual for instructions on how to install the expansion board.

To do so perform the following steps:

1. Make sure to stop any recordings in progress.

Note: You may plug/unplug the sync cable while the analyzer unit is powered on.

2. Connect the female end of the sync cable to the SYNC OUT port of the SierraFC M164.
3. Connect the male end of the sync cable to the SYNC IN port of the PCIe Summit T3-16.

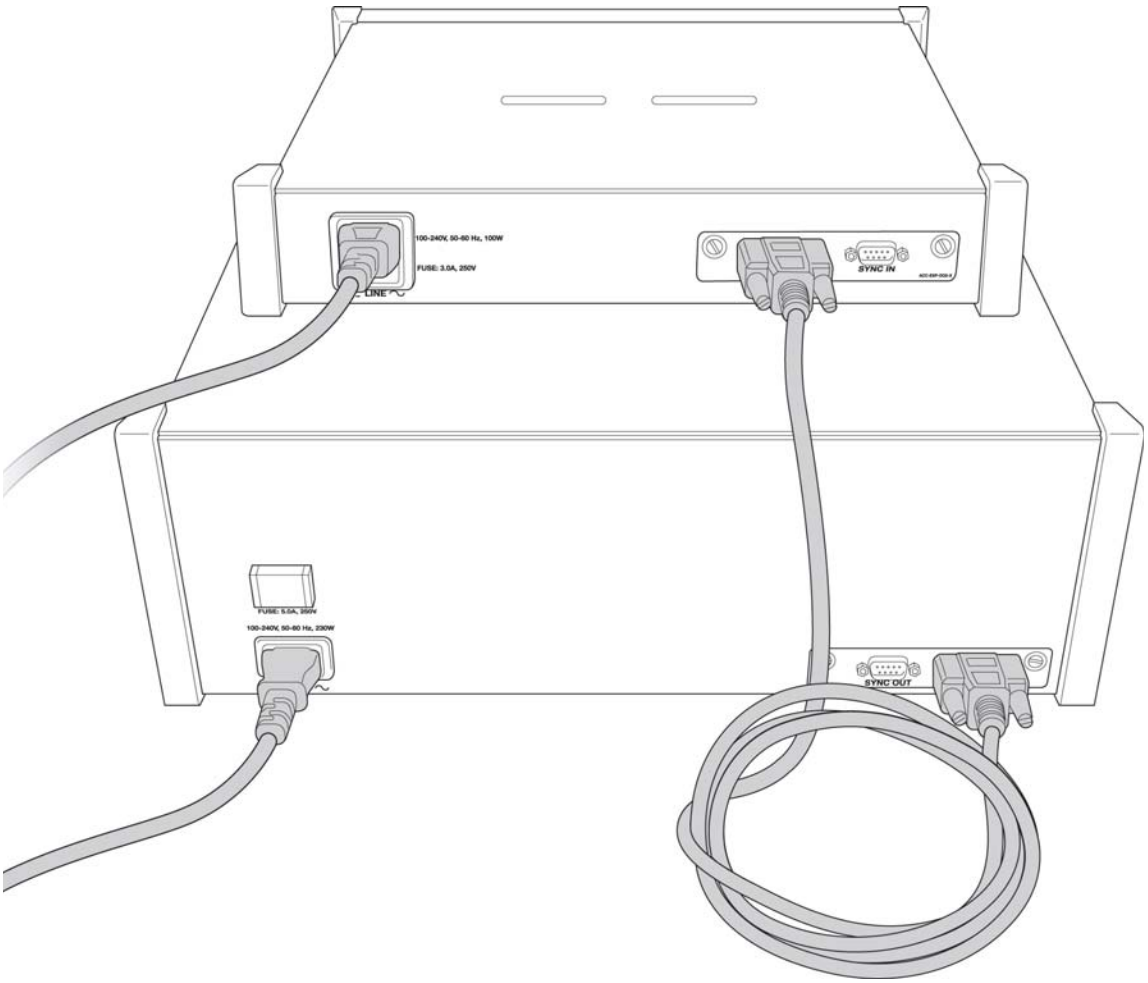


Figure 1.9: An Example of Connecting a SierraFC M164 and a Summit T3-16

Select Device

After you start the software, click on **Configuration a**nd select **All Connected Devices** (see the following screen capture).

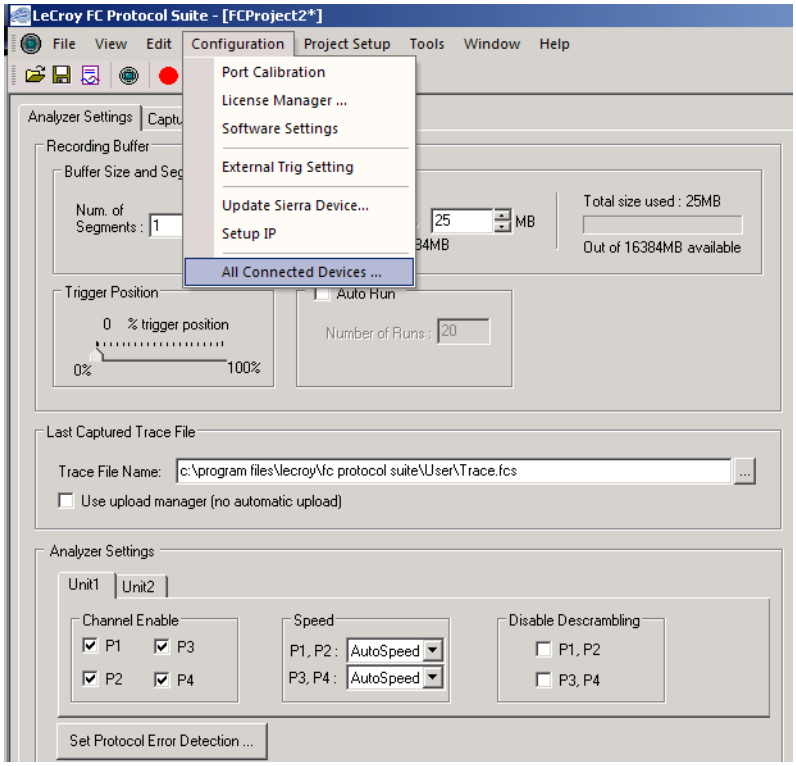


Figure 1.10: Connecting to Device(s)

The following **Select Device** dialog displays. The colors in the 'Location' column mean the following:

- Red: Firmware and/or BusEngine components need to be updated to the latest version
- Light Blue: The device is ready to be connected.
- Yellow: The device is locked.
- Green: The software is connected and ready to run

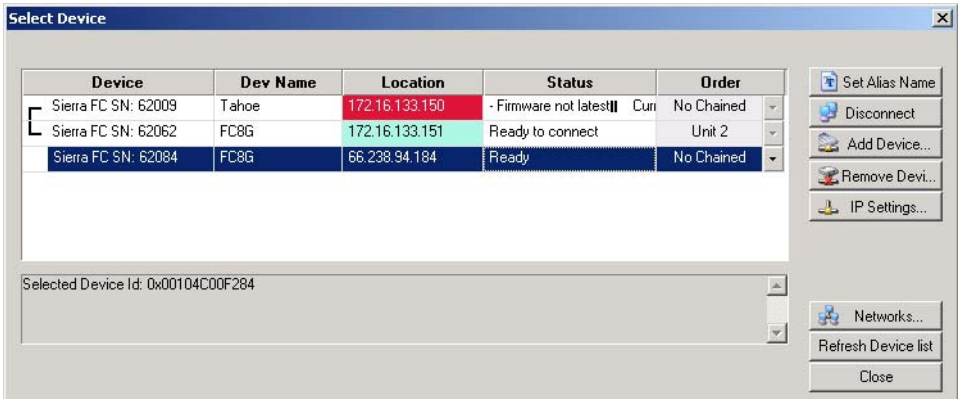


Figure 1.11: Select Device Dialog

Note: Click **Refresh Device List** to display all the devices on the network.

The Select Device dialog displays the following buttons:

Set Alias Name

Click **Set Alias Name** to display the Set device alias name dialog as shown below.

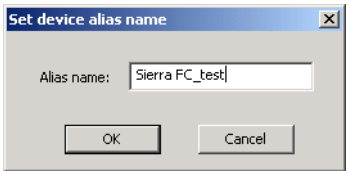


Figure 1.12: Set Device Alias Name Dialog

Disconnect

Click **Disconnect** to disconnect a device.

Add Device...

Click **Add Device** to add a device with a static IP address.

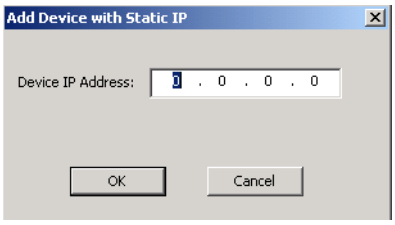


Figure 1.13: Add Device with Static IP Dialog

Remove Device

Click **Remove Device** to remove a previously added device.

IP Settings...

Click **IP Setting** to reset IP settings of a device. The following IP Setting dialog displays. Press Tab to move between fields.

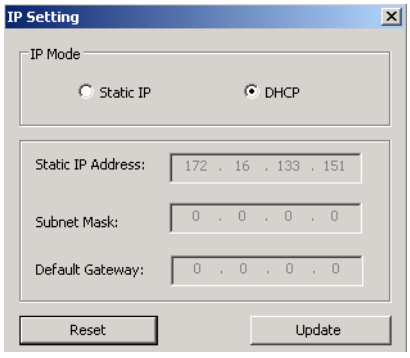


Figure 1.14: IP Setting Dialog

Networks...

Click **Networks** to select an adapter. The following dialog displays.

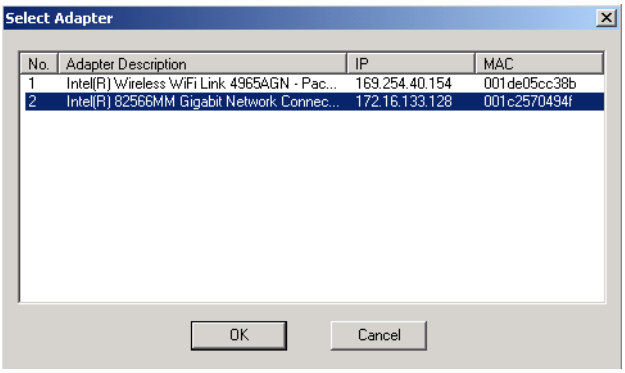


Figure 1.15: Select Adapter Dialog

Refresh Device List

Click **Refresh Device List** to refresh the device list.

To connect to a device, select a device which is Ready to Connect and click the **Connect** button on the right. The Connection Properties dialog is displayed (see the following screen capture).

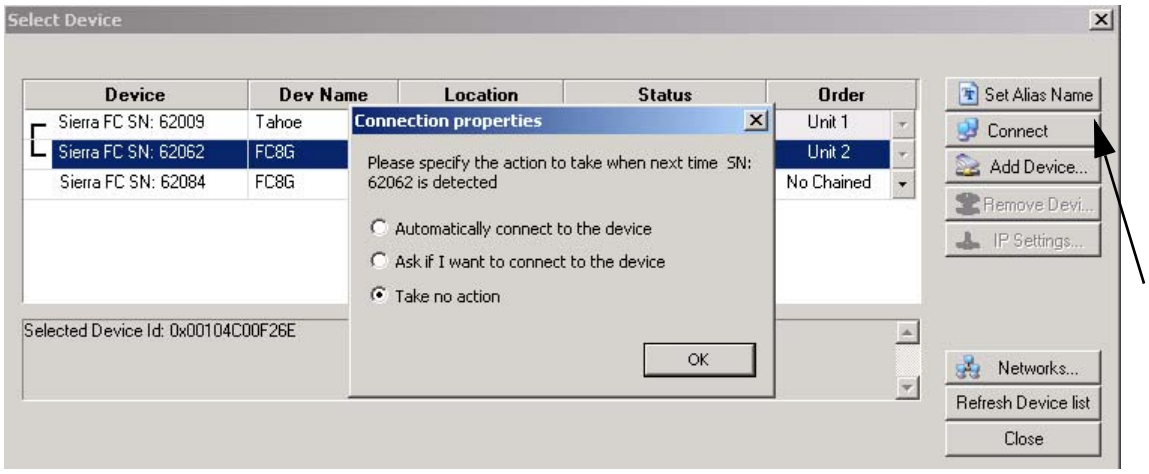


Figure 1.16: Connection Properties Dialog

Specify one of the actions from the following:

- Automatically connect to the device
- Ask if I want to connect to the device
- Take no action

If 'Automatically connect to the device' is selected, the next time the application opens the device will be automatically connected.

In the **Select Device** dialog chained or cascaded units are displayed in the **Device** column with a **[** (square bracket) icon. The sequence of the units is displayed in the **Order** column. See the following screen capture.

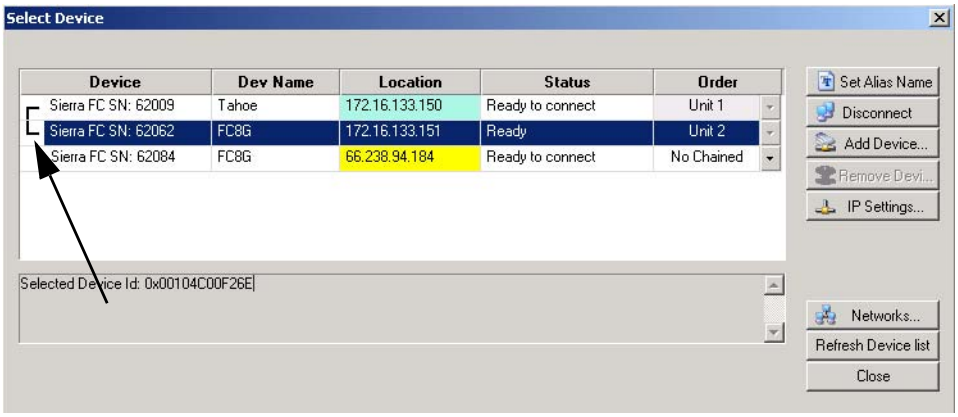


Figure 1.17: Select Device Dialog Displaying Unit 1 and Unit 2 Chained

Note: When using STX Sync cards, you need to manually specify the order of the chained units. To match your unit sequence to the address for each unit in the Select Device dialog, click the pull down tab under the Order heading (on the right side) and select unit numbers: 1 for Unit 1, 2 for Unit 2, and so on. This determines the order in which the cascaded ports appear in the trace. When using the CATC Sync cards the order is automatically detected.

IMPORTANT! Power up all units before starting the software.

Connecting via Ethernet

The Ethernet connection can have any of these configurations:

1. Analyzer connected to a network using a hub, switch, Gigabit Ethernet interface, or similar device.
2. Analyzer connected to the host machine (machine running the application software), using a hub, switch, Gigabit Ethernet interface, or similar device.
3. Analyzer connected directly to the host machine using an Ethernet cable.

Connecting to a Network

When connected to a network, the analyzer can communicate with the DHCP server to establish a connection. The DHCP server continually sends the next available IP address to the analyzer until the software starts.

The SierraFC M164 product uses the following ports:
TCP Ports: 4000 - 4003

UDP Ports: 4027 - 4029

Connecting using a Hub, Switch, or Similar Device

When connected to the host machine using a hub, switch, Gigabit Ethernet interface, or similar device, the Analyzer must be given a static IP address such that it will reside on the same subnet as the host machine. See Figure 1.14 on page 24 to set the IP address. To add the IP address to the Select Device dialog, use the Add Device button (see Figure 1.13 on page 24).

Analyzer Connected Directly to the Host Machine Using a Ethernet Cable

When connected to the host machine using a crossed ethernet cable, the Analyzer must be given a static IP address such that it will reside on the same subnet as the host machine. See Figure 1.14 on page 24 to set the IP address. To add the IP address to the Select Device dialog, use the Add Device button (see Figure 1.13 on page 24).

Connecting Over Different Subnets

If the host machine (with the Sierra software) and SierraFC M164 are on the same subnet, they will see each other's broadcasts, and the SierraFC M164 application will automatically appear in the Select Device dialog, from which you can select a device (as described in the previous section).

If the host machine and SierraFC M164 do not reside on the same subnet, they will not see each other automatically. You must add the SierraFC M164 IP address manually. To add the IP address, use the Add Device button (see Figure 1.13 on page 24).

Connecting Via USB

To set up the Analyzer using a USB connection:

1. Remove the Analyzer from its shipping container.
2. Insert the Installation CD.
3. Connect the Analyzer to a power outlet using the provided power cord.
4. Connect the USB port to a USB port on the PC using a USB cable.
5. Turn on the rear power switch and the front power switch.
6. Click **Next** after you see the Add New Hardware Wizard window.
7. Follow the Microsoft® Windows® on-screen Plug-and-Play instructions for the automatic installation of the Analyzer as a USB device on your PC. (The required USB files are included on the Installation CD.)
8. Click **Finish** when you see the message that says "Windows has finished installing the software that your new hardware requires" and the file has been installed in your PC.

Do not change from USB to Ethernet, or back, without power cycling the Analyzer.

To connect the Analyzer to a host machine via ethernet, refer to"Connecting the SierraFC M164 to a Host Machine System Over Ethernet" on page 257.

Launching Your Analyzer

To launch the software, double-click the FC Icon in the Program Manager Window.

Click OK to display the software.

Operating in Simulation Mode

The system operates in Simulation Mode by default if the software detects no hardware. However, you can operate in Simulation Mode directly, without installing the Analyzer hardware.

The Analyzer software launches and displays the appropriate tool bar, but with the limitation that the Analyzer operates only on static, previously captured, bus data.

Limitations

Simulation Mode lets you try all of the available functions, but the system is not capturing any real data and is displaying only pre-captured results.

Using the Software

The SierraFC M164 application has protocol analysis software to capture data, trigger on Events, and save. Easy Mode allows standard Trigger and Data capture. Advanced Mode (see figure below) allows you to program custom triggering in and out, capturing, state jumps, and timers. (See “Protocol Analysis” on page 33.)

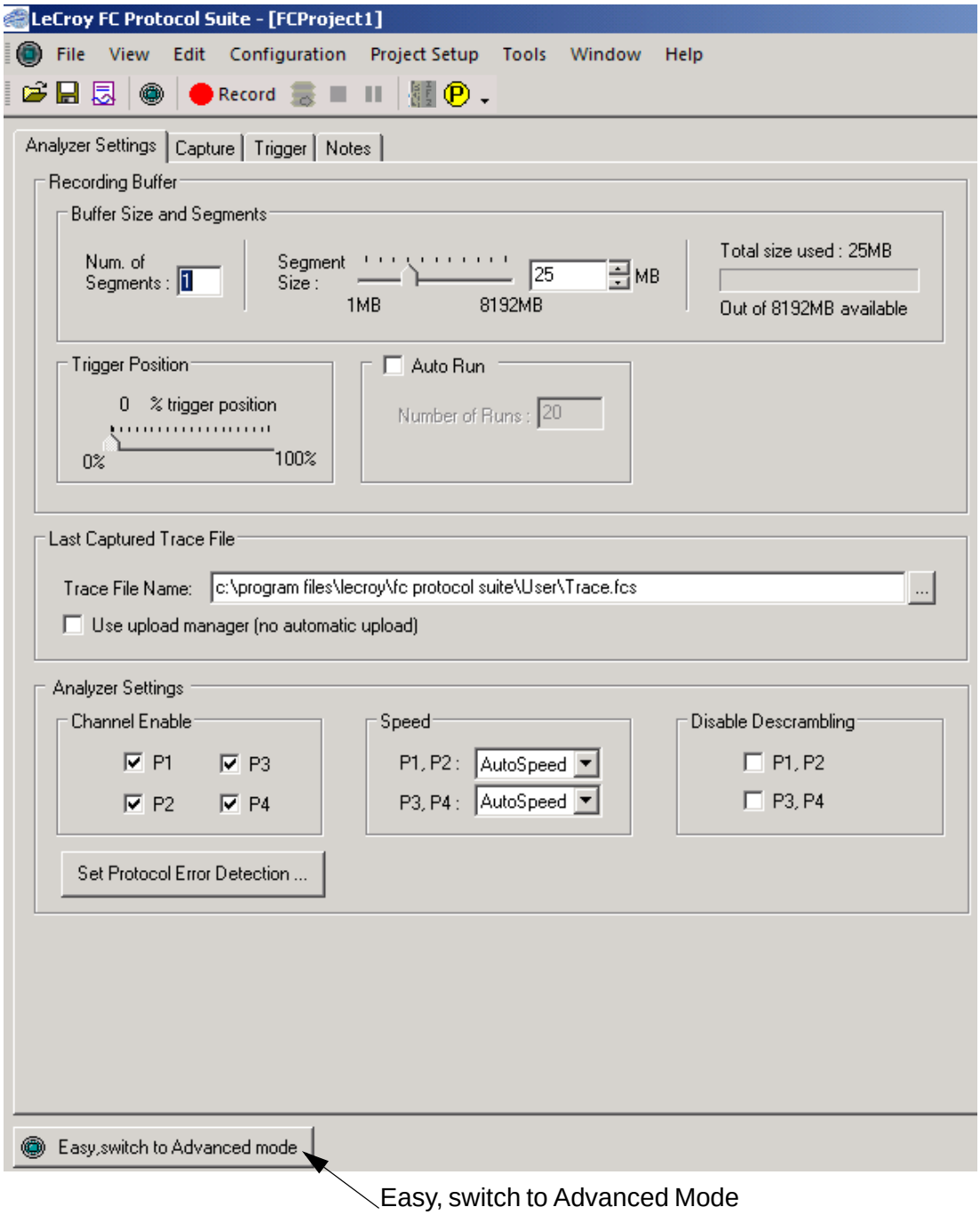


Figure 1.18: Easy/Advanced Mode Toggle Button

Protocol Analyzer

To use the software for protocol analysis (see on page 29), first select File > Protocol Analyzer for a new project or File > Open an existing protocol analysis .fcc file. (See “Protocol Analysis” on page 33.) You can also open a .fcs example file. Example files are in the Examples folder. You can also use Project Setup > Last Protocol Analyzer.

In Easy Mode, on the Capture tab, select to capture Everything or Pattern. For Pattern, select a Pattern. You can exclude patterns and frames. You can do this by dragging patterns from the Patterns Library pane into the Active pane. You can use different patterns for pre-trigger and post-trigger.

In Easy Mode, on the Trigger tab, select the trigger type. For Pattern, select the pattern.

In Easy Mode, on the Settings tab, select trigger position and memory use.

Change the Analyzer settings if necessary. Change the port Speed if necessary.

Use Advanced Mode only after you become familiar with the hardware and software and have special needs. To start working with the protocol analyzer and software. See “Protocol Analysis” on page 33.

Viewing Captured Data

After data capture, the captured data is in the Viewer, see “Display Manipulation” on page 181. You can display the same data in:

- **Spreadsheet View**: Shows Protocol Fields and Frames by time.
- **Frame Inspector View**: Shows detail information about packet highlighted in Spreadsheet or Packet views.
- **Packet View**: Shows hierarchical view of frames, sequences and exchanges.
- **Text View**: Shows transaction frames, grouped in columns by port.
- **Statistical Report View**

You can do the following:

- Show or hide fields and ports, change port names, and change data format.
- Show the layers and channels using their toolbars.
- Decode using the Decode toolbar.
- Quick View shortens the time to view a recent trace (see “Quick View” on page 184)
- Quick Search and Quick Filter (“Quick Search” on page 239 and “Quick Filtering” on page 231).
- Search and Filter in Advanced mode (see “Search Setup in Advanced Mode” on page 240 and “Filter Setup in Advanced Mode” on page 232).

Configuration

For special work, you can use the Configuration menu to configure Port Alias, External Trig Setting, Software Settings, and Input/Output Signals. (“Display Manipulation” on page 181.)

Port Status

You can display an overview of the active ports by clicking the buttons at the bottom right of the main window (see “Port Status” on page 202).

Statistical Reports

You can generate statistics for all transports, commands, primitives, addresses, lanes, and errors (see “Statistical Report” on page 209).

InFusion

The Teledyne LeCroy InFusion™ Error Injector and Traffic Modifier is an error injector and traffic modification tool that allows you to verify real-world fault handling for SierraFC systems (see “FC InFusion” on page 255).

CrossSync Control Panel

The CrossSync Control Panel allows you to select analyzers for synchronization and manage the recording process. It supports a wide combination of Teledyne LeCroy’s flagship analyzers including PCI Express Gen 1, Gen 2 and Gen 3; USB 2.0 and 3.0; Serial ATA (SATA) 1.5, 3 and 6Gbps; Serial Attached SCSI (SAS) 6Gbps and Fibre Channel 1. 2, 4 and 8Gbps systems.

CrossSync is Teledyne LeCroy’s analyzer synchronization solution that enables time-aligned display of protocol traffic from multiple daisy-chained analyzers showing packet traffic from multiple high-speed serial busses. A lightweight software control panel allows users to select analyzers for synchronization and manage the recording process. Captured traffic is displayed using the latest analyzer software (in separate windows) with all the protocol specific search and reporting features.

Captured packets are displayed in separate windows that share a common time scale. Navigating the traffic in either direction will scroll to the same timestamp in a synchronized window. When using the CrossSync option, users can access the full complement of analysis capabilities available within the individual Teledyne LeCroy software. Search, reporting, and decoding all operate normally (see “CrossSync Control Panel” on page 40).

This feature is available with the Teledyne LeCroy SierraFC Fibre channel Protocol Suite application.

Chapter 2

Protocol Analysis

The system performs Protocol Analysis by defining and running an analysis project. An analysis project definition defines what to capture, what the analyzer triggers on, and the memory settings. You can save defined projects as project ***.fcc** files for later use.

Supported Protocols

The supported protocols are listed below:

- FCP
- ARB
- ELS
- GS
- SW
- FICON
- FCAE-ASM
- FCAE-1553
- FCAE-RDMA
- FCVI
- FCAV
- ADVB
- VSAN

Easy Mode (Pre-Defined Setups)

After you install the Analyzer software (see “Software Installation” on page 16) and set up the Analyzer (see “Hardware Setup” on page 17), launch the Analyzer software (see “Launching Your Analyzer” on page 28) to display the default Protocol Analyzer in Easy Mode at the Capture tab.

This mode allows you to operate the analyzer with minimum setup. In this mode, you can perform only a Trigger and Data capture.

Main Window

Use Easy Mode to get a comprehensive overview of your analyzer’s capabilities:

On the Analyzer Menu Bar, click **File > Protocol Analyzer** to open a Protocol Analyzer dialog.

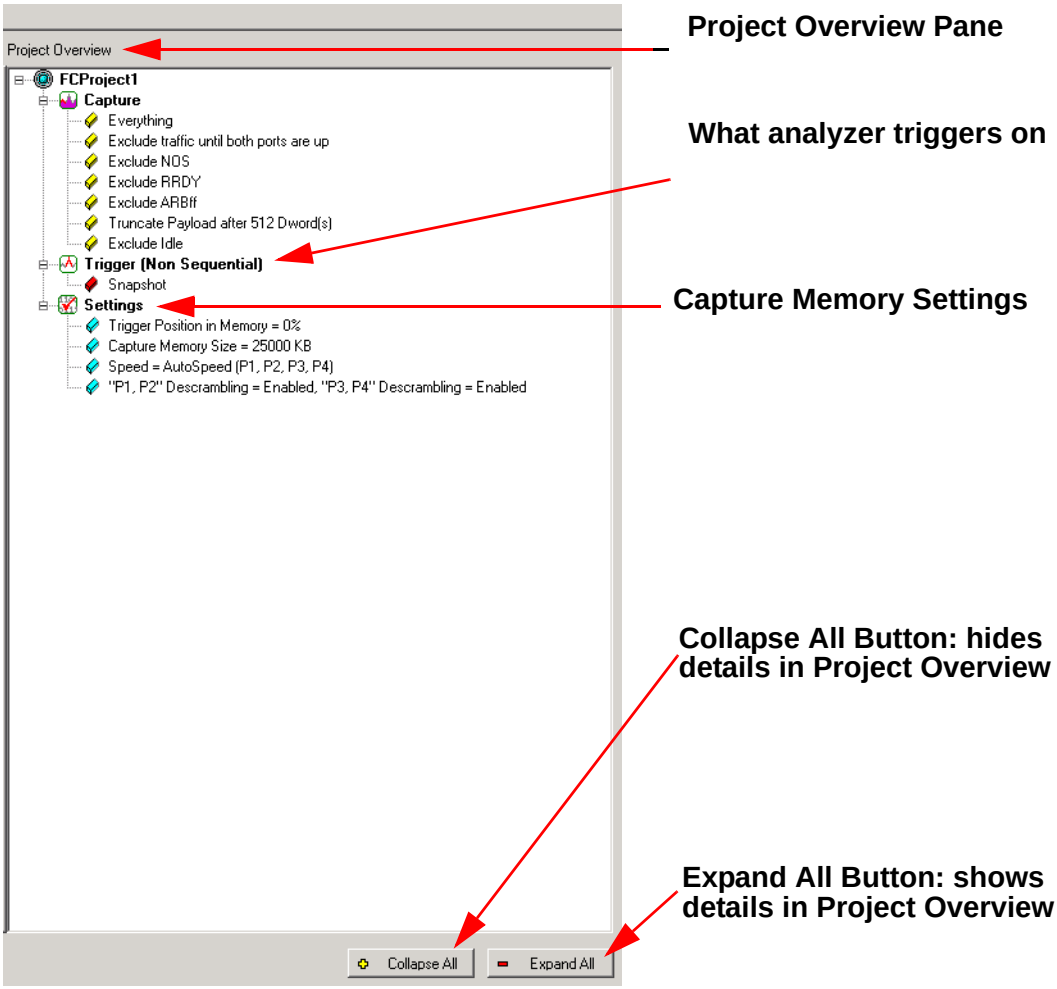


Figure 2.1: Protocol Analysis Project Dialog

The New Project dialog opens with default settings to capture Everything on the bus and to Trigger On on Snapshot. (The analyzer captures everything immediately without triggering on anything in particular).

Analyzer Settings

Buffer Size and Segments

The Analyzer Settings tab has the Recording Buffer pane where you can set Number of Segments and the Segment Size. (See “Buffer Size and Segments” on page 172.)

Trigger Position

You can set the trigger position in the captured buffer as a percentage of the segment size. Trigger point of 0% means the trigger point will be on the first packet in the buffer. (See “Trigger Position” on page 172.)

Auto Run

Checking the Auto Run option allows you to specify the number of concurrent runs that will be automatically carried out. (See “Auto Run” on page 172.)

Training Signal Pack Mode

This options provides two modes for training signals.

- Unpacked
- Packed

Last Captured Trace File

Browse to the location to upload the last captured trace file. Alternatively check the box to use the Upload Manager.

Analyzer Settings

You can enable the ports, set the port speed and disable descrambling.

Disabling a port can be used to save recording buffer space. A disabled port can still trigger the analyzer.

Auto Speed is the default port speed selection. It will automatically detect and display the line speed. In rare cases (such as debugging speed negotiation), it might be desired to set the analyzers speed manually. Note, that when the speed is set manually, traffic at different speeds will not be captured correctly.

You can disable descrambling.

Set Protocol Error Detection

You can select which Protocol Errors the analyzer will show and which will be ignored.

Project Overview

The Project Overview on the right side of the main window displays a comprehensive tree structured overview of the project. The project tree shows what to capture, on what the analyzer triggers, and the capture memory settings.

Capture Tab

The Capture tab allows you to set the parameters for capturing patterns. The Capture dialog box opens with default settings to capture Everything on the bus. The analyzer captures everything immediately without triggering on anything in particular.

You can drag and drop patterns from the Patterns Library pane into the Active Pane. You can select the pattern and use the Add and Remove arrows to move patterns between the Patterns Library and the Active pane. You can copy and sort the patterns.

Note: Capturing a 16GB trace requires you to capture the traffic with both ports (P1, P2 & P3, P4), otherwise, only an 8GB trace is captured.

Truncate Payload

Check this option to truncate payload after x-number of Dword(s).

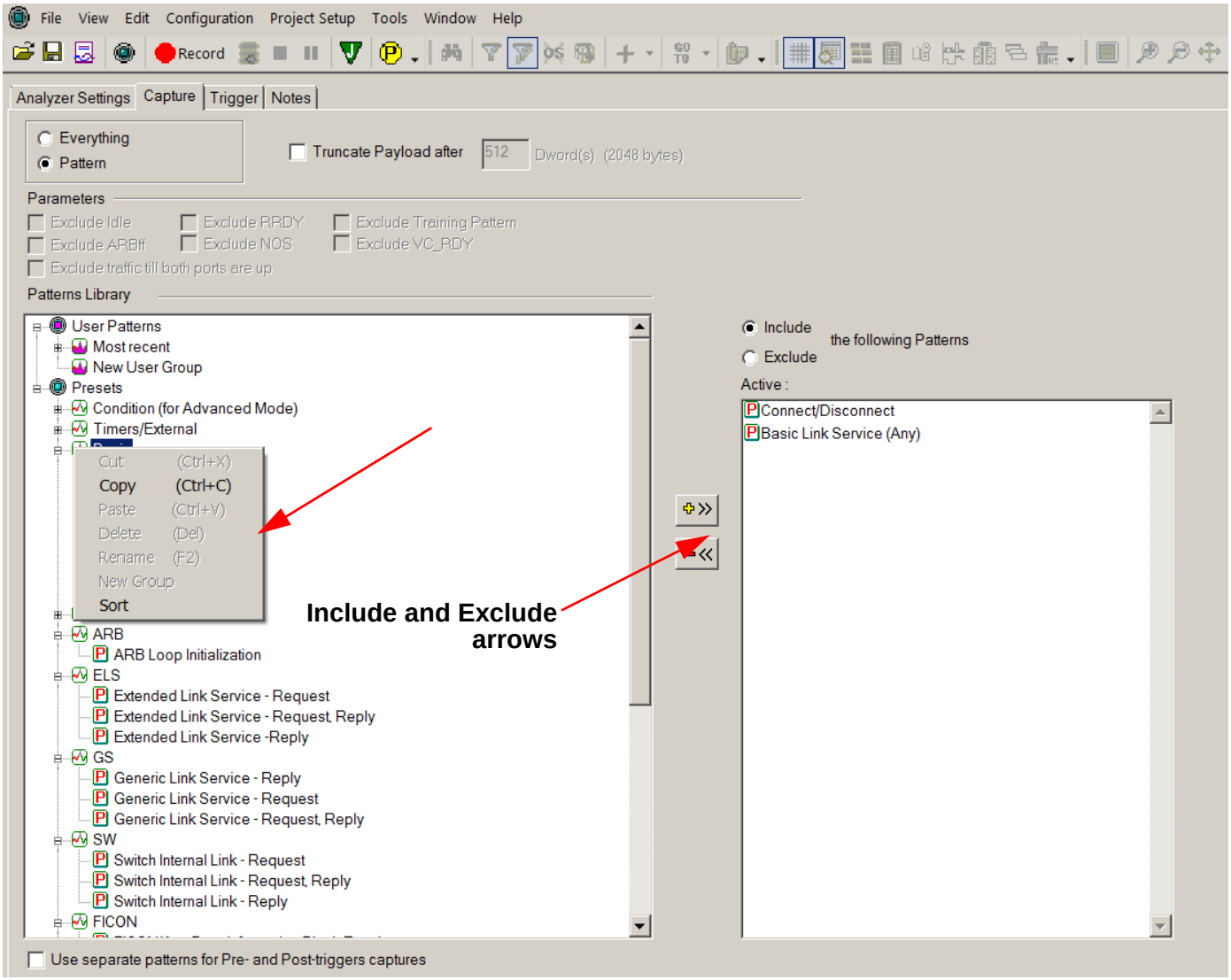


Figure 2.2: Capture Dialog

Parameters

The Capture tab has the following parameters. See Figure 2.3 on page 37.

Exclude Idle
Check this to exclude Idles from the data capture.

Exclude RRDY
Check this to exclude RRDY primitives from the data capture.

Exclude Training Pattern
Check this to exclude Training Pattern primitives from the data capture.

Exclude ARBff
Check this to exclude ARBff primitives from the data capture.

Exclude NOS
Check this to exclude NOS primitives from the data capture.

Exclude VC_RDY
Check this to exclude VC_RDY primitives from the data capture.

Exclude traffic till both ports are up
Check this to exclude traffic till both ports are up.

Use separate patterns for Pre- and Post-triggers captures replaces the Capture tab with a Pre-Trigger Capture tab and a Post-Trigger Capture tab.

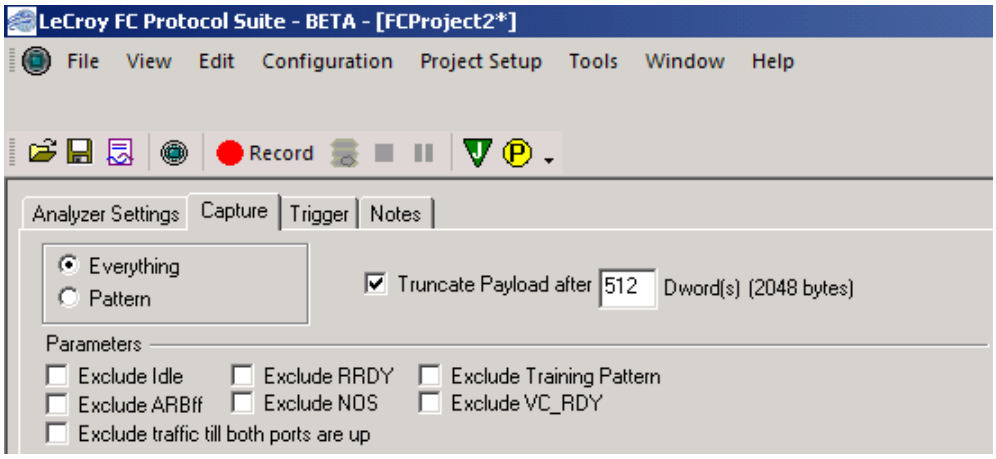


Figure 2.3: Protocol Analysis Capture Dialog

Software Menus and Toolbar

The software has the following main toolbar.

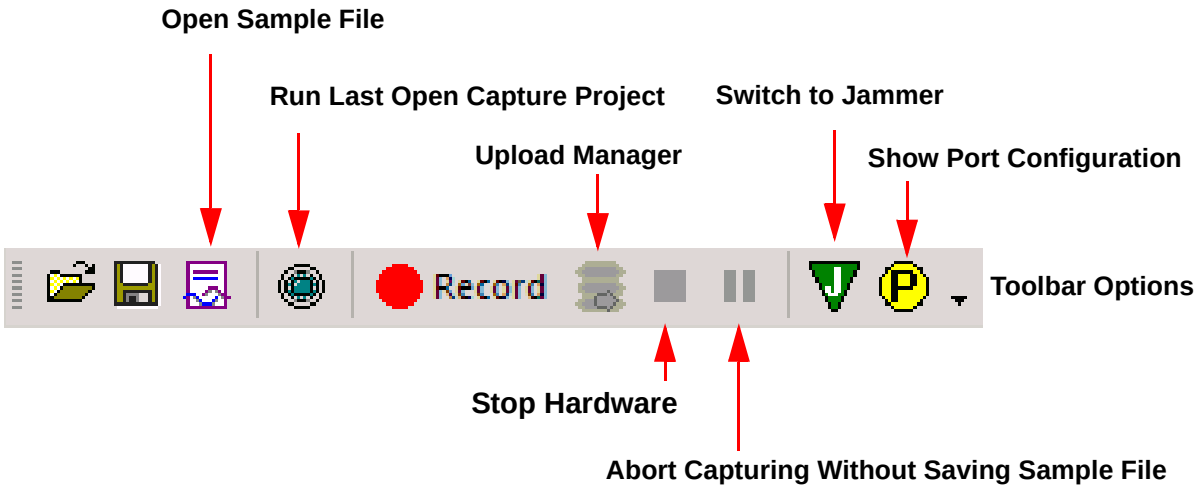


Figure 2.4: Main Toolbar

Run Hardware

To get an immediate overview of the bus traffic to and from your Analyzer:

1. Click the

Record button.

2. The analyzer begins filling the defined memory buffer with traffic on the bus. After the traffic fills the memory buffer, the traffic is uploaded to the viewer and all views are displayed, except the Statistical Report View.
3. Spreadsheet View is the default display. However, you can view results in any of the different views by selecting **View** on the menu bar and choosing the desired View. Note: the software remembers the last view (or views combination) used, and will automatically use that next time it is launched.
4. How to add additional buttons need to add to 4. You can add additional keys to the view panel. Please follow the steps:

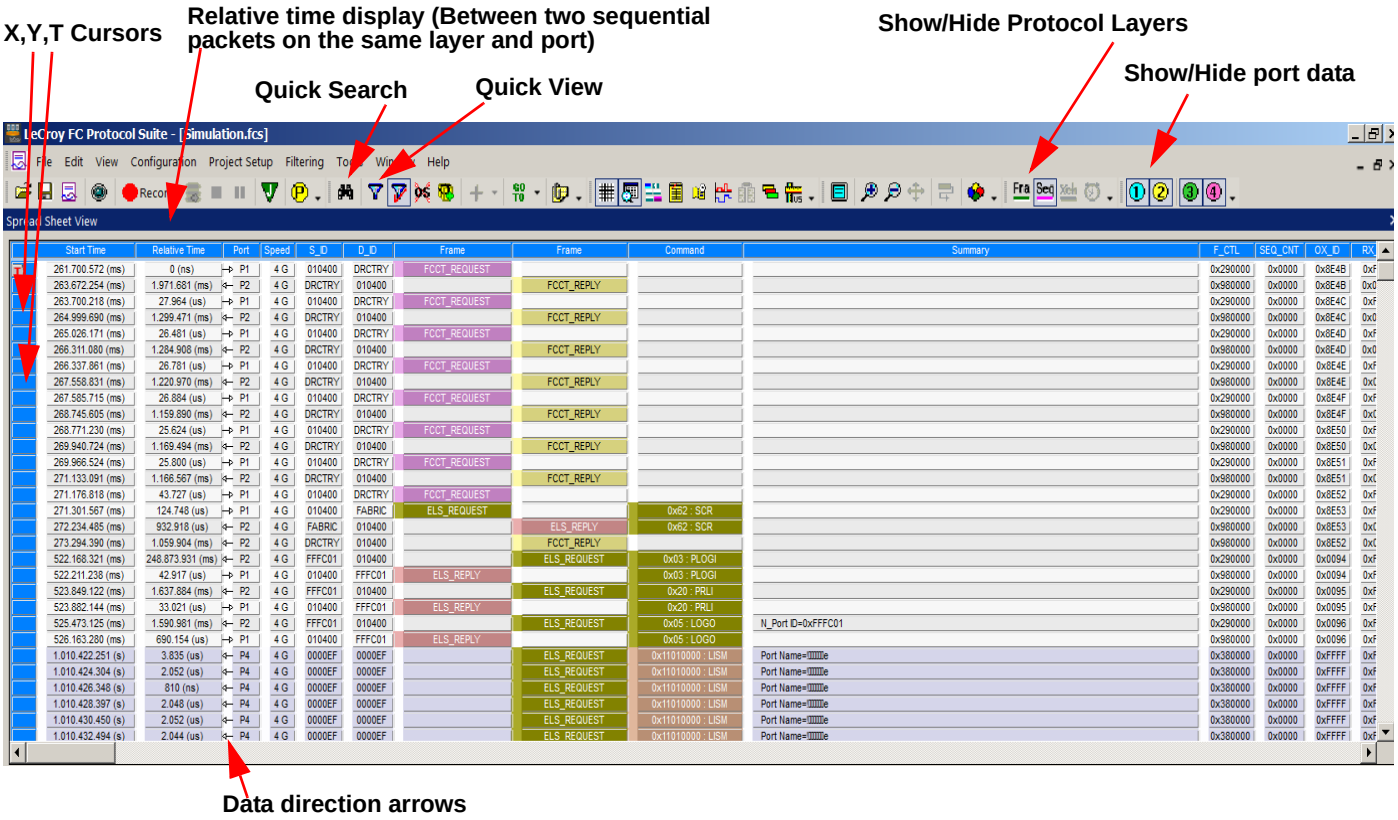

X,Y,T Cursors
Relative time display (Between two sequential packets on the same layer and port)
Quick Search
Quick View
Show/Hide Protocol Layers
Show/Hide port data
Data direction arrows

Figure 2.5: Typical Spreadsheet View Results Display

The results display shows each transaction for every layer identified in a different color and the data direction identified with data direction arrows. Upstream traffic has an arrow from right to left: ⇐. Downstream traffic has an arrow left to right: ⇒.

You can hide any layer by clicking the corresponding **Show/Hide** button on the menu bar. The system retains all captured data, but the display has only some data layers for simpler viewing.

You can configure the viewer display for test and viewing preferences (see “Viewer Display” on page 181 for details about configuring the viewer display).

The Analysis Project dialog offers you a comprehensive set of choices to create a trigger and capture project satisfying some specific need. You can set the Analyzer to:

- Capture specific patterns (see “Patterns and Data Capture Setup” on page 44).
- Capture different patterns pre- and post-trigger (see “Patterns and Data Capture Setup” on page 44).
- Exclude parameters from capture (see “Patterns and Data Capture Setup” on page 44).
- Trigger on a pattern or sequence of patterns (see “Trigger Setup” on page 149).
- Configure trace capture memory (see “Project Settings” on page 180).
- Select file to save trace capture in memory (see “Project Settings” on page 180).
- Include a project note (see “Notes” on page 180).

Saving a Trace Capture

You can save a Trace Capture for review at a later time using the **Save As** dialog.

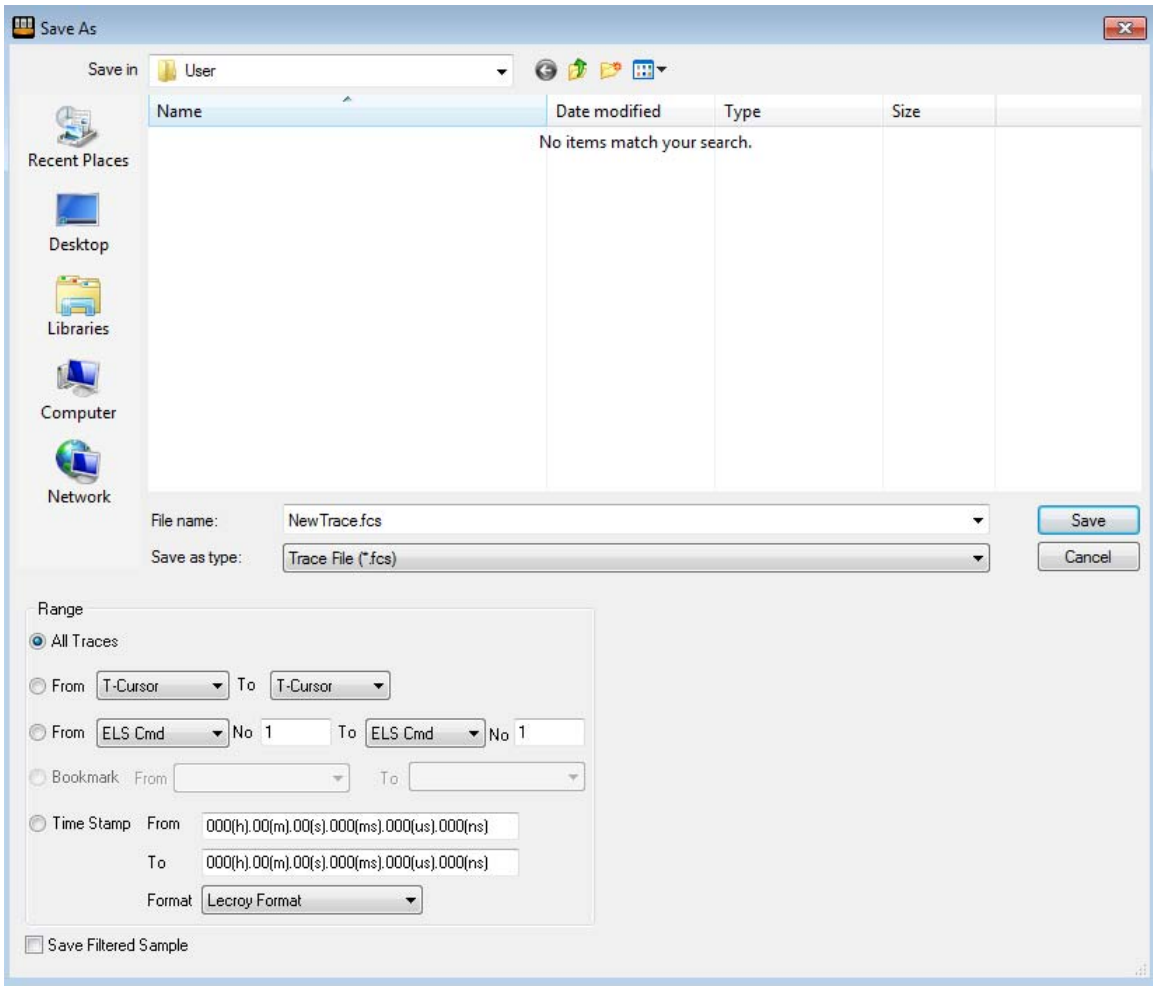


Figure 2.6: Save As Dialog

You can limit the range of the saved file. You can save:

- All Traces
- A range between selected cursors
- A range between selected levels of decoding. The levels allowed are dependent on the traffic in the trace. A trace with only Switch traffic might have the following levels available: ELS Cmd, Frame, GS Cmd, Sequence and SW Cmd, whereas a read-write trace might have Frame, SCSI Cmd and Sequence available.
- A range between selected timestamps. Specify the time format from the drop-down list.

Save Filtered Sample checkbox saves a trace file without filtered data.

CrossSync Control Panel

The CrossSync Control Panel allows you to select analyzers for synchronization and manage the recording process.

Launching the CrossSync Control Panel

To launch CrossSync from the FC Protocol Suite software application, select the '**Launch CrossSync Control Panel** 'entry in the 'Project Setup' menu (see the screen below). Or, you can launch CrossSync from the '**Start**' menu.

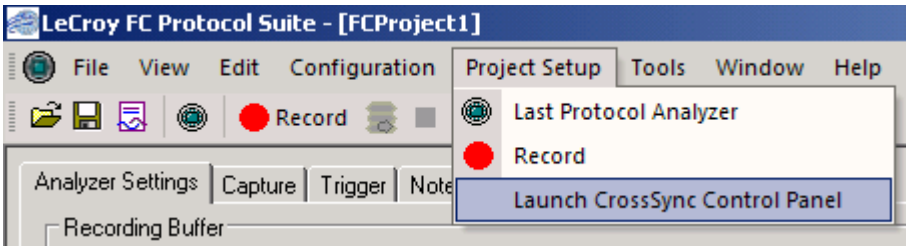


Figure 2.7: Launching CrossSync from the SierraFC M164 Protocol Suite Application

Please refer to the *CrossSync Control Panel User Manual* for more information.

Projects

You can define a new project, starting with the default project definition, or modify the settings for the last project run.

New Default Project
To start a New project, select File on the main menu bar and choose Protocol Analyzer to open a new project with default settings that you can modify (see “Main Window” on page 33).

Last Project

Clicking the Green button opens the last project run, so you can modify it.

Project File Types

Projects have the following file types:

- *.cfg Display Configuration file (in the System folder “Config” subfolder)
- *.fcc Protocol Analyzer/Capture Project/Viewer file
- *.fcs Sample file
- *.wsf Workspace file

Example Projects

The Analyzer includes example projects that you can use to perform an immediate analysis without any setup.

The Analyzer system software has a pre-defined folder (directory) structure for storing all files. All example files are in the Examples folder under the SierraFC M164 folder.

It is strongly recommended that you open some example files to see types of projects that you can create.

Run an Example Analysis Project

To run an example project:

1. Select **File > Open.**
2. Locate example analysis projects by looking in the Examples folder. Examples are available for AdvanceCaptr, EasyCaptr, and Samples.
3. In the Samples folder, choose an example ***.fcs** file and click **Open** to display the example project dialog.

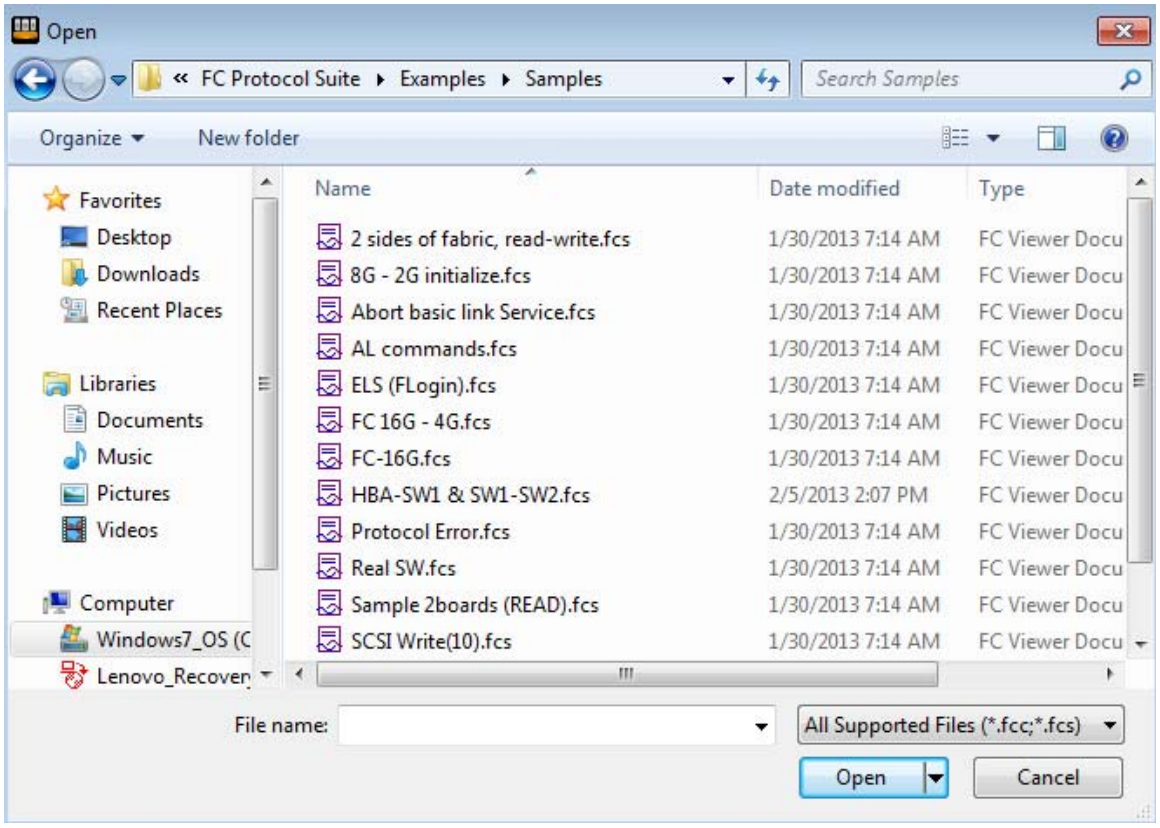

Open
FC Protocol Suite ▸ Examples ▸ Samples
Search Samples
Organize
New folder
Favorites
Desktop
Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Computer
Windows7_OS (C
Lenovo_Recover
Name
Date modified
Type
2 sides of fabric, read-write.fcs 1/30/2013 7:14 AM FC Viewer Docu
8G - 2G initialize.fcs 1/30/2013 7:14 AM FC Viewer Docu
Abort basic link Service.fcs 1/30/2013 7:14 AM FC Viewer Docu
AL commands.fcs 1/30/2013 7:14 AM FC Viewer Docu
ELS (FLogin).fcs 1/30/2013 7:14 AM FC Viewer Docu
FC 16G - 4G.fcs 1/30/2013 7:14 AM FC Viewer Docu
FC-16G.fcs 1/30/2013 7:14 AM FC Viewer Docu
HBA-SW1 & SW1-SW2.fcs 2/5/2013 2:07 PM FC Viewer Docu
Protocol Error.fcs 1/30/2013 7:14 AM FC Viewer Docu
Real SW.fcs 1/30/2013 7:14 AM FC Viewer Docu
Sample 2boards (READ).fcs 1/30/2013 7:14 AM FC Viewer Docu
SCSI Write(10).fcs 1/30/2013 7:14 AM FC Viewer Docu
File name:
All Supported Files (*.fcc;*.fcs)
Open
Cancel

Figure 2.8: Open File Dialog

4. Click the **Record** button to execute the pre-defined example.

5. After the project runs, you see an analyzer trace capture display.

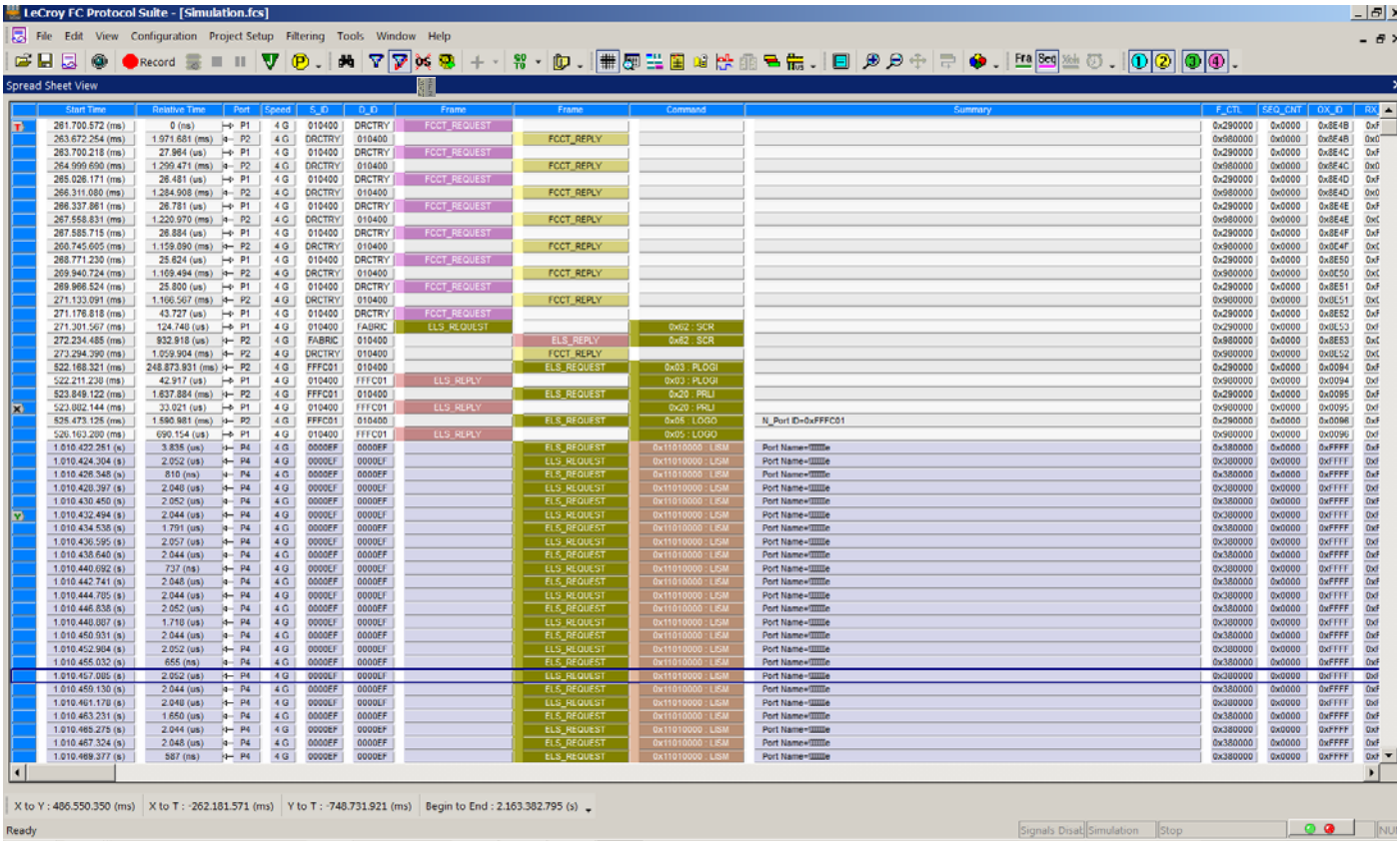


Figure 2.9: Analyzer Trace Capture Display

For details about the results display, see “Display Manipulation” on page 181 and see “Viewer Configuration” on page 244.

Patterns and Data Capture Setup

You can refine data capture by choosing **Pattern** and then selecting specific patterns for capture. Additionally, you can define a different set of patterns to capture after trigger.

To define specific patterns for capture, click the **Pattern** button to display the Capture tab for Pattern (see Figure 2.10 on page 44. You can drag and drop patterns from the Patterns Library pane into the Active Pane. You can select the pattern and use the Add and Remove arrows to move patterns between the Patterns Library and the Active pane. You can also copy and sort patterns

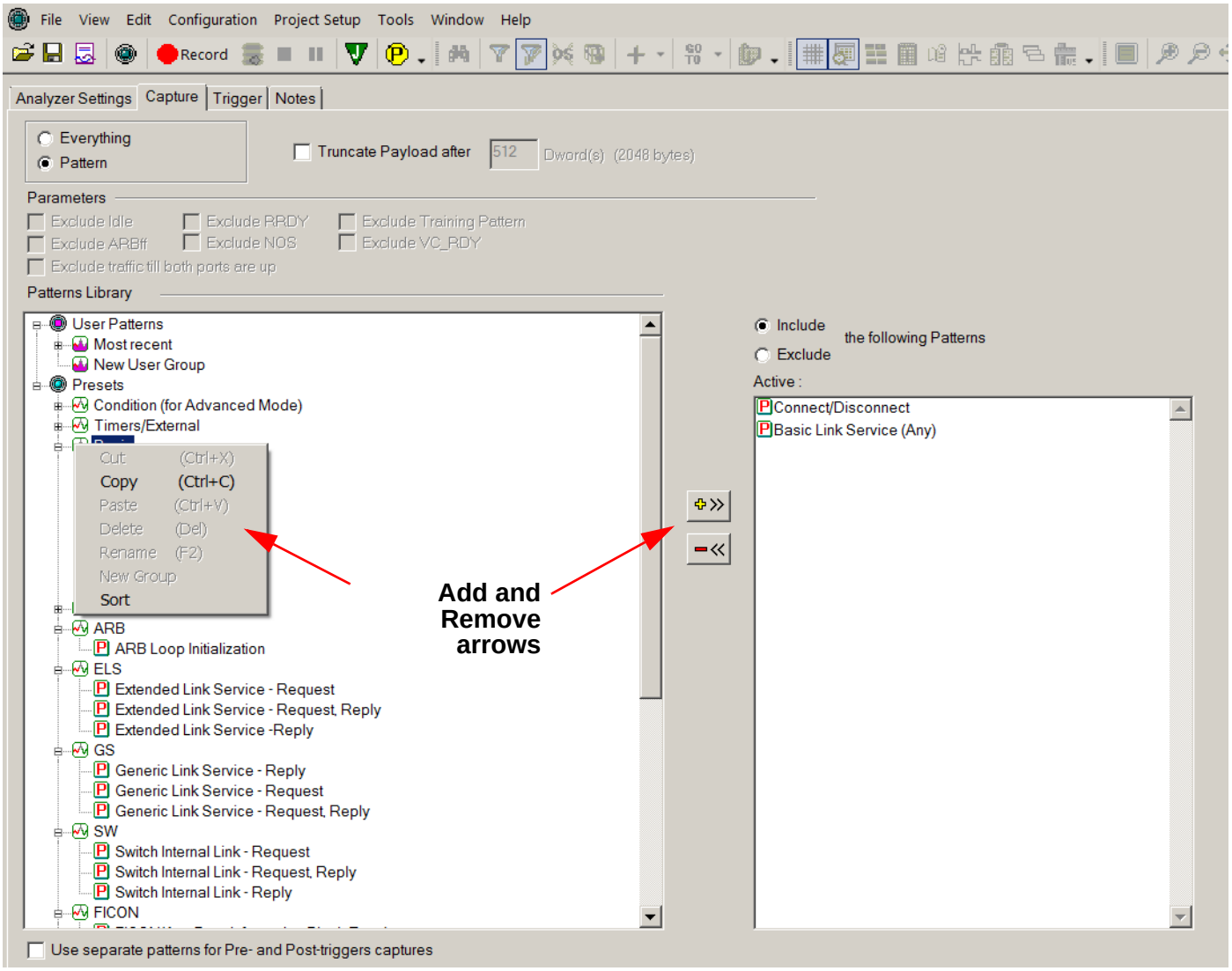


Figure 2.10: Choosing Capture Patterns

Choose a Parameter

To choose a parameter for capture from any of these categories, highlight the category in the parameter window and click the **+>>** button to add the selection. You can also drag and drop a pattern. This opens selection dialogs for each of the categories displaying all of the parameters for that category. All patterns added appear in the Project Overview.

Include Patterns

This is the default selection. Check this box to allow for the capture of the patterns that have been added to the Project Overview. When you Include Patterns, only those patterns will be recorded, thus saving buffer space and emphasizing only what the user needs. However, to get proper context, you would typically need to include a lot of Patterns. To Exclude only unwanted Patterns is another option.

Exclude Patterns

Check this box to allow for the capture of everything except the patterns that have been added to the Project Overview.

When you check the Exclude Patterns box, the Ordered Set category appears in the Pattern List, and the Exclude Idle item appears in the Project Overview under the Capture (Exclude) branch.

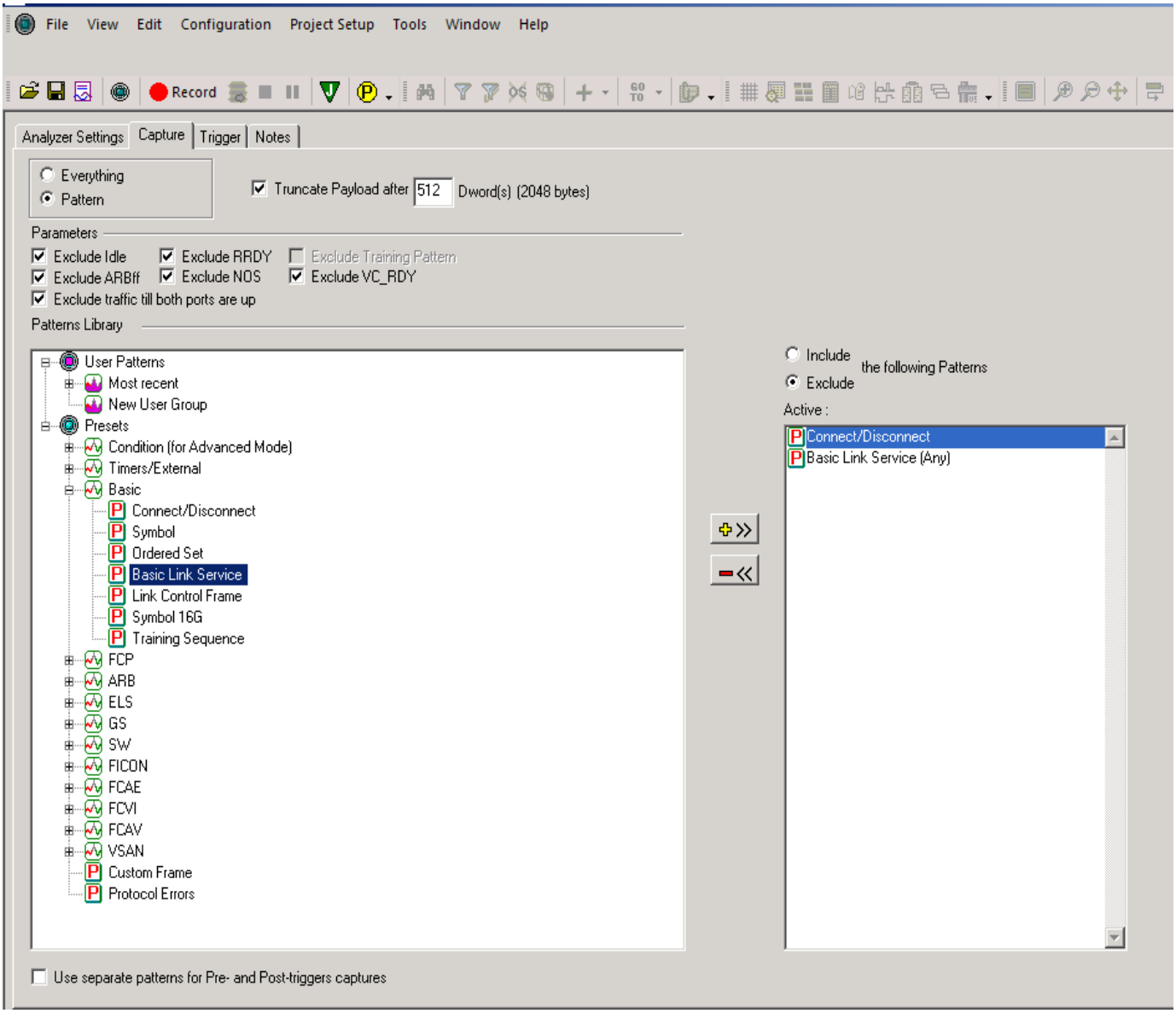


Figure 2.11: Exclude Patterns Checked

To remove an item from capture, highlight it in the Project Overview and click the **-<<** button.

Pre- and Post Trigger Data Capture

You can define one set of patterns for capture prior to the occurrence of a trigger and another set of patterns for capture after the occurrence of a trigger. The selection and setup procedure is the same for both Pre-Trigger capture and Post-Trigger capture.

Check **Use separate patterns for Pre- and Post-trigger captures** to enable the Pre-Trigger Capture and Post-Trigger Capture tabs (instead of only the Capture tab).

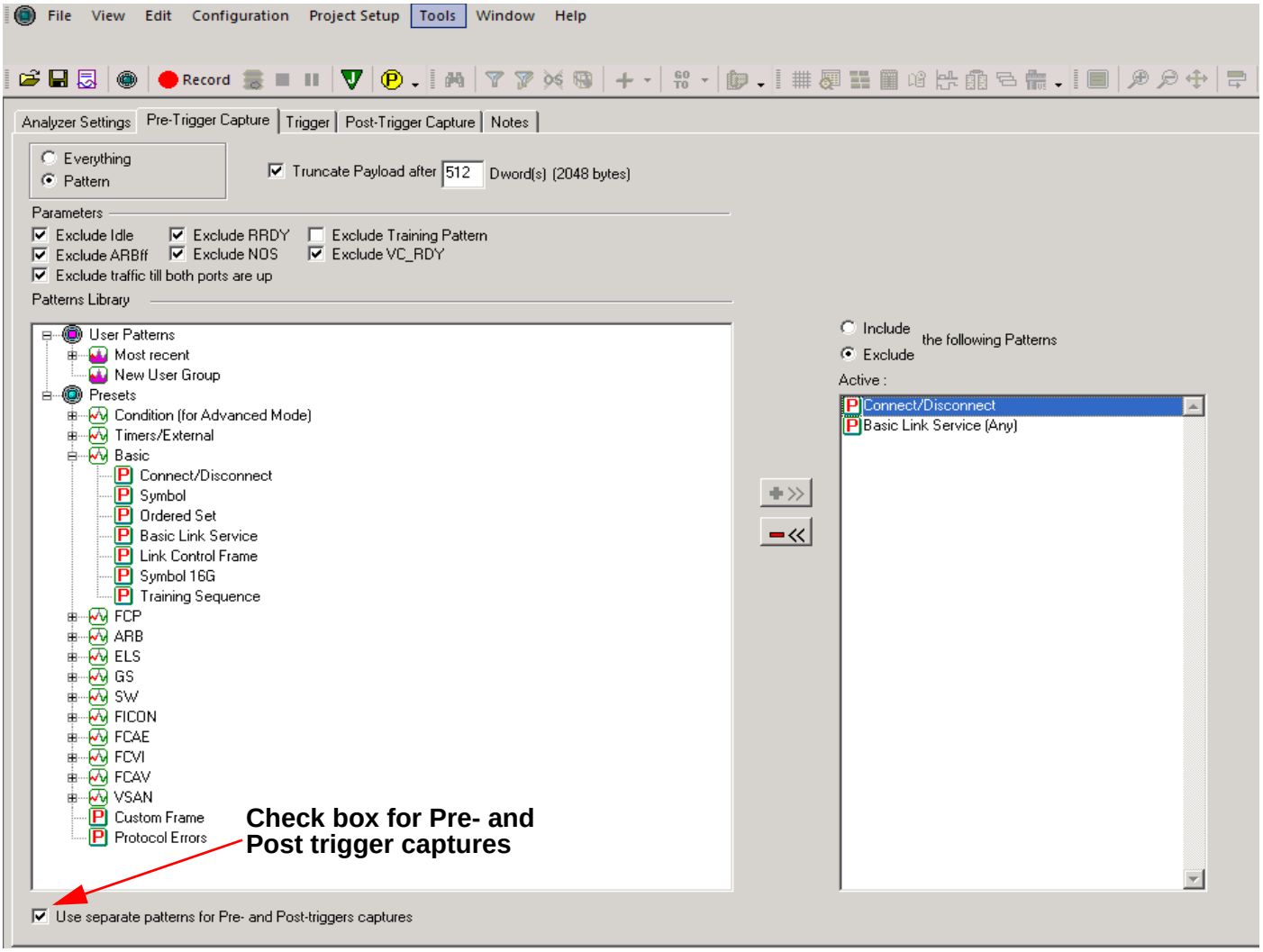


Figure 2.12: Pre-Trigger and Post-Trigger Capture Dialog Enabled

Defining Patterns

To select an item for capture, either highlight the category and click the **+>>** button, or double-click the category, to open a corresponding definition dialog.

You can define patterns for specific ports by checking or unchecking the Port ID.

Basic Patterns

Connect/Disconnect

Double-click **Connect/Disconnect** to open the Add Connect Disconnect Pattern dialog.

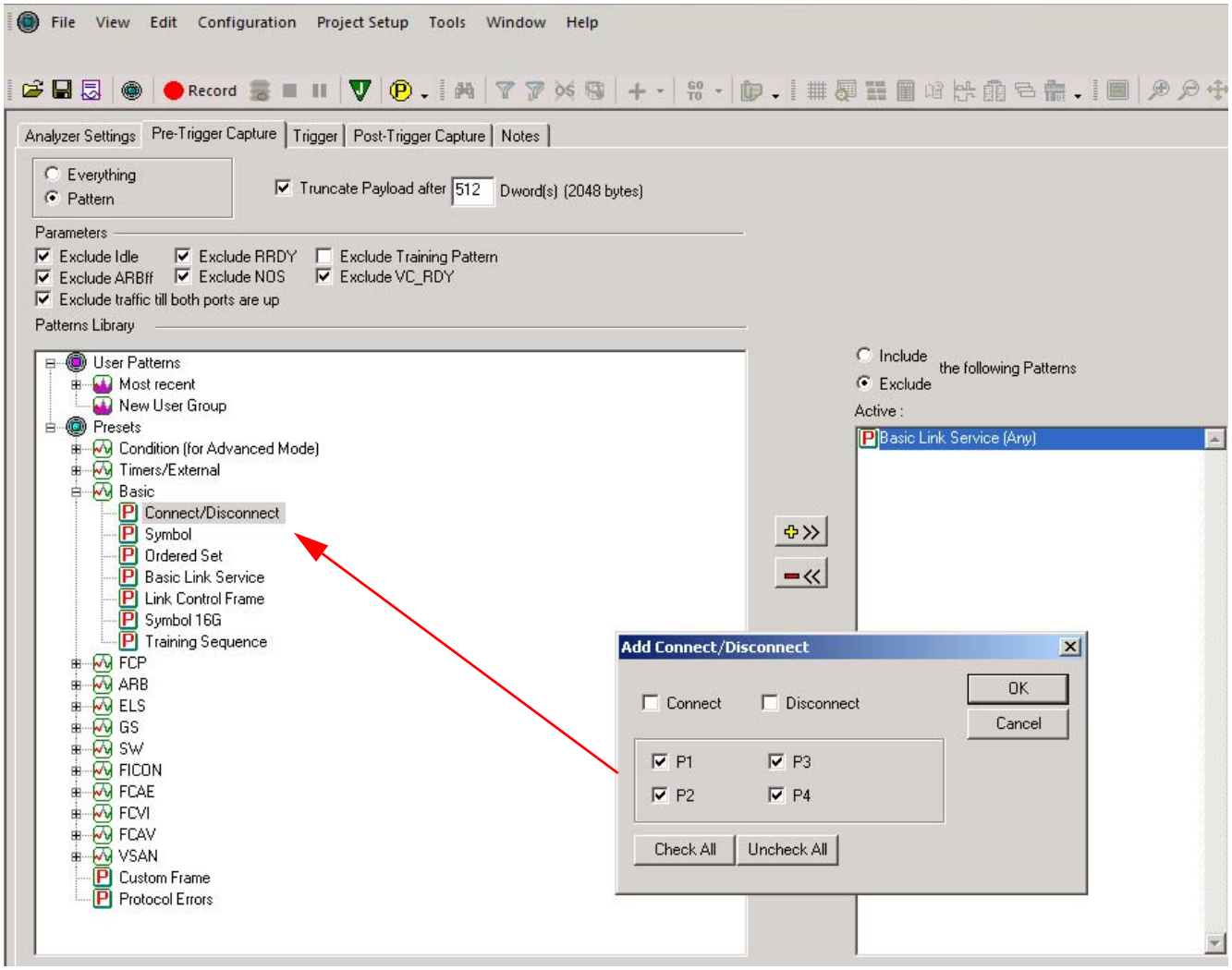


Figure 2.13: Connect Disconnect Pattern Dialog

Check **Connect** and/or **Disconnect**.

Ordered Set

Double-click **Ordered Set** to open the Add Ordered Set Pattern dialog.

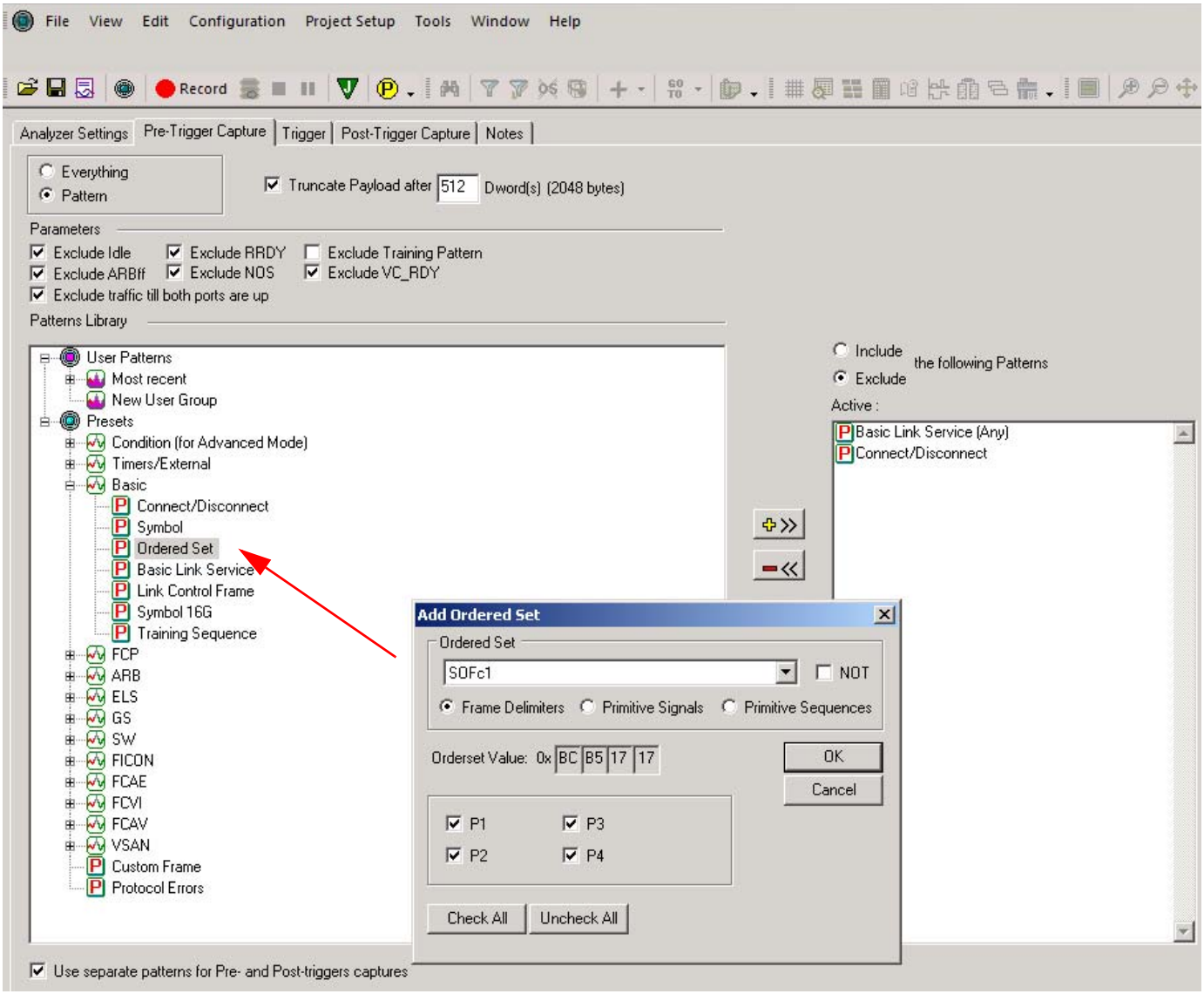


Figure 2.14: Ordered Set Pattern Dialog

To select an **Ordered Set**, click the dropdown list. You can choose **NOT** to trigger on anything that is NOT the defined pattern. You can choose **Frame Delimiters, Primitive Signals**, or **Primitive Sequences**.

Note: The **Symbol** pattern is only available on the Trigger tab, and when using the Ordered Set pattern, only the Exclude option is available.

Basic Link Service

Double-click **Basic Link Service** in the Pattern window to open the Add Basic Link Service Pattern dialog.

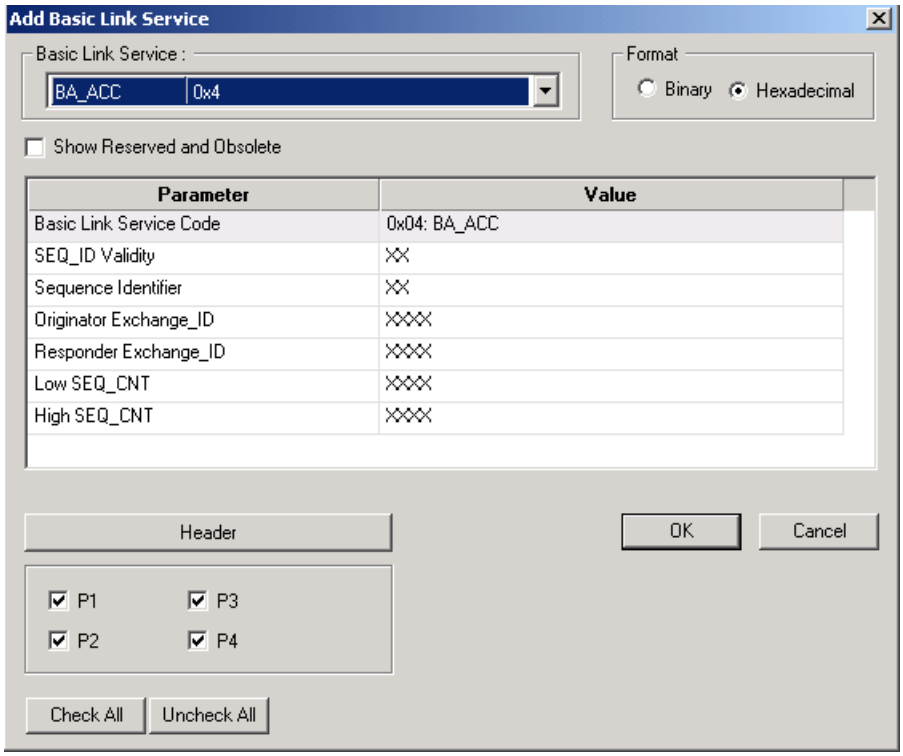


Figure 2.15: Basic Link Service Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Basic Link Service**, click the dropdown list.

Link Control Frame

Double-click **Link Control Frame** in the Pattern window to open the Add Link Control Frame Pattern dialog.

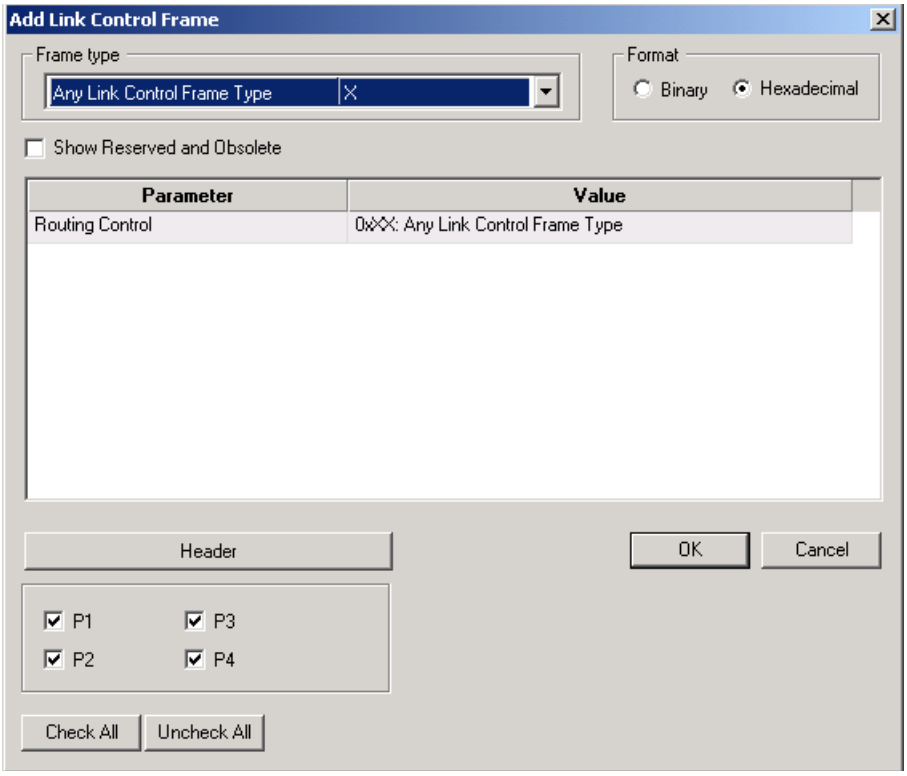


Figure 2.16: Link Control Frame Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Link Control Frame**, click the dropdown list.

Symbol 16G

The Symbol 16G cannot be added as a Capture Pattern.

Training Sequence

The Training Sequence cannot be added as a Capture Pattern.

Capture (Filter Out)

Exclude **Training Sequence.**

FCP Patterns

FCP SCSI Command

Double-click **FCP SCSI Command** in the Pattern window to open the Add FCP SCSI Command Pattern dialog.

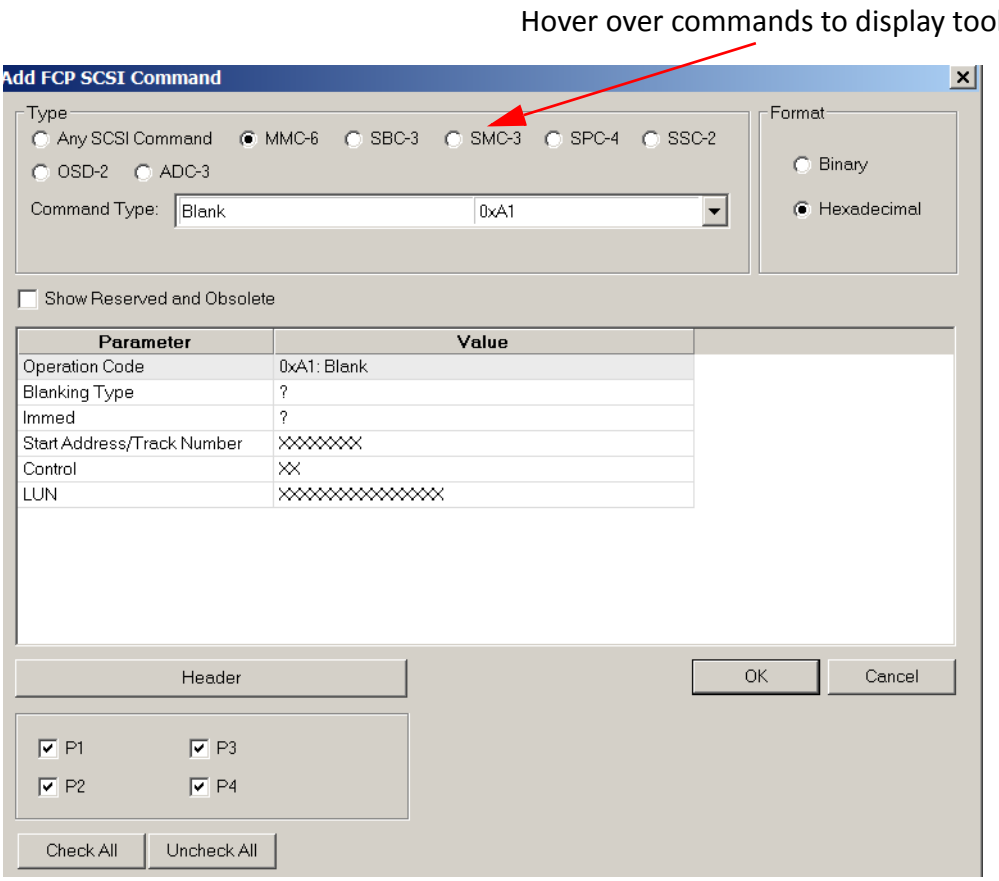


Figure 2.17: FCP SCSI Command Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

If you select **Any SCSI Command**, the Command Type can only be **Any Command**. Click the down arrow next to the CDB dropdown list, scroll the list to choose a CDB Type, and click **OK**. The **Any** option allows specifying any vendor-specific or other command.

If you select **MMC-6, SBC-3, SMC-3, SPC-4, SSC-2, OSD-2**, or **ADC-**3, click the down arrow next to the Command Type dropdown list, scroll the list to choose a Command Type, and click **OK**.

FCP Frame Information Unit

Double-click **FCP Frame Information Unit** in the Pattern window to open the Add FCP Frame Information Unit Pattern dialog.

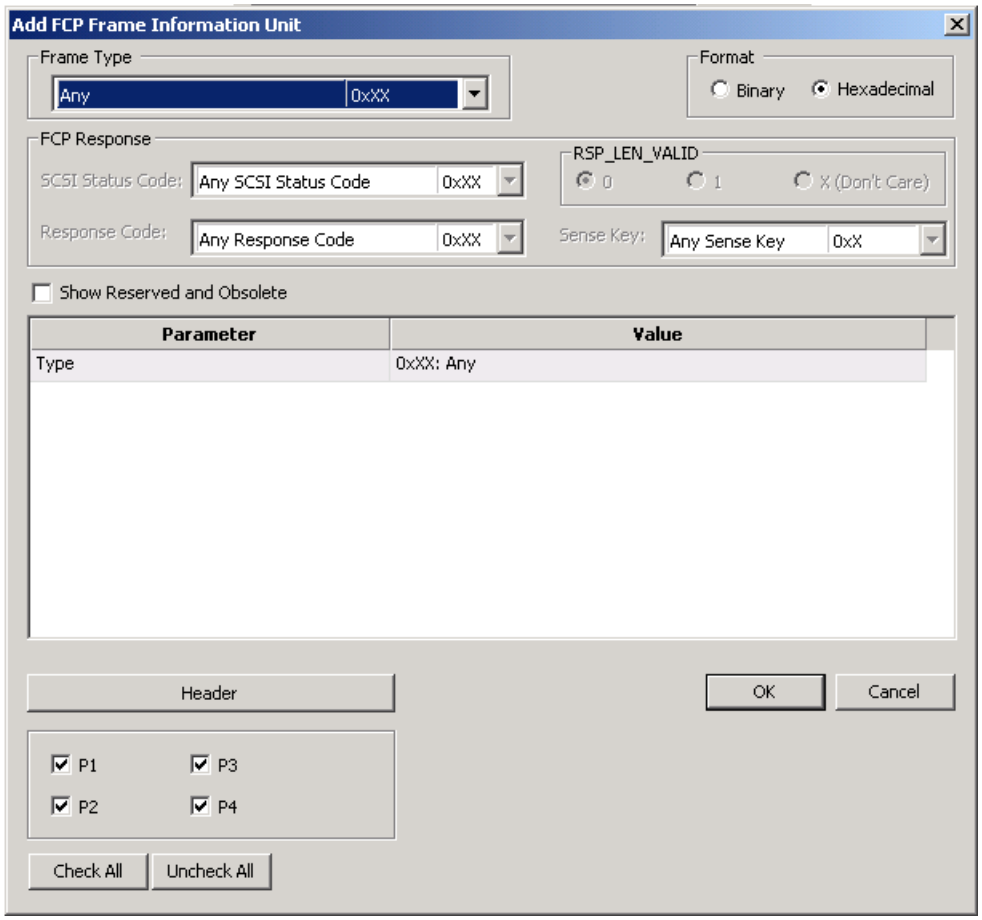


Figure 2.18: FCP Frame Information Unit Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Frame Type**, click the dropdown list. On selecting a Frame Type the Parameters and Value of that Frame Type are displayed.

SCSI Command Status

Double-click **SCSI Command Status** in the Pattern window to open the Add SCSI Command Status Pattern dialog.

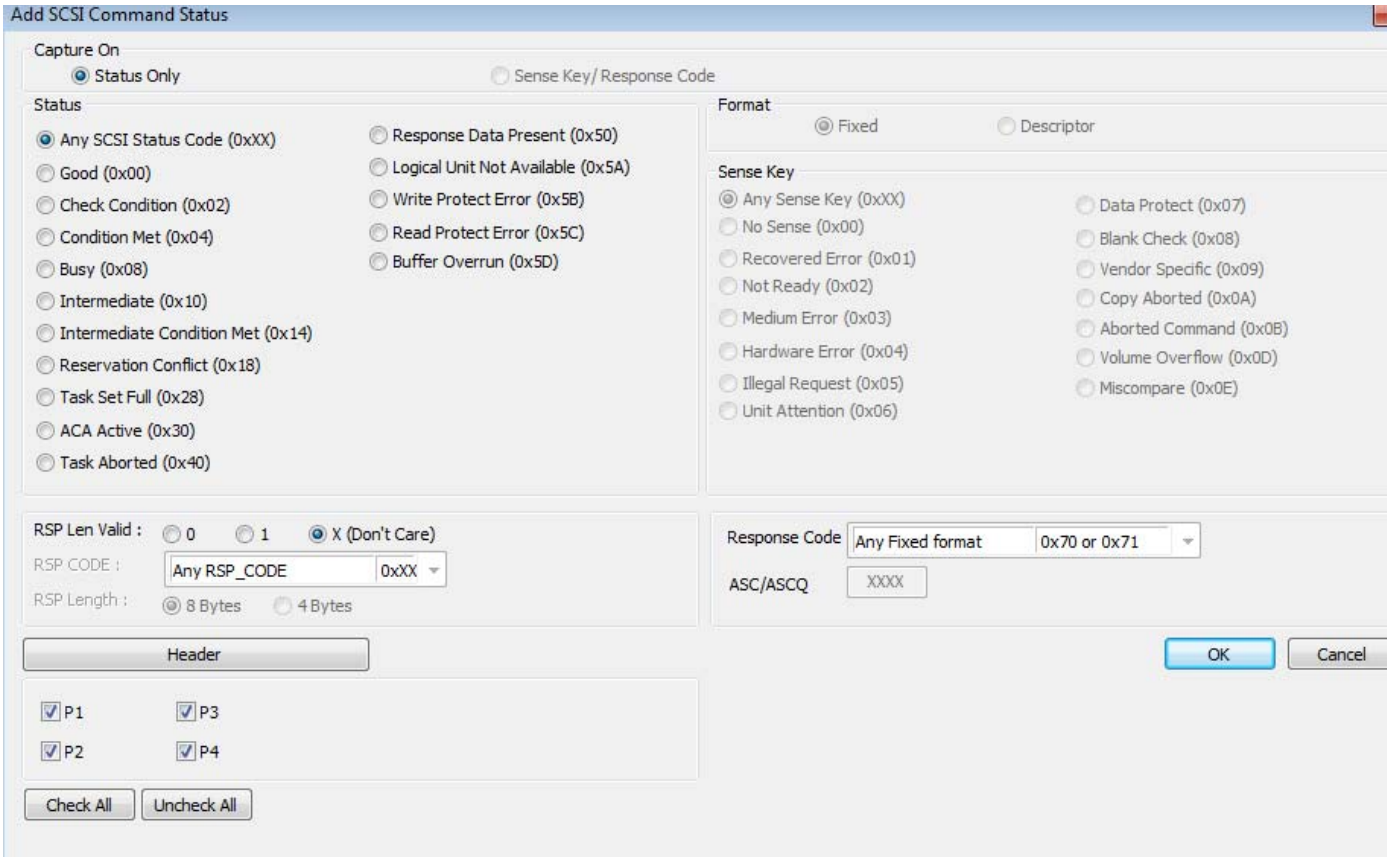


Figure 2.19: SCSI Command Status Pattern Dialog

You can capture on **Status Only** or **Sense Key/Response Code**. Click on **Status Only** to display all the states that are available. Click on the **Sense Key/Response Code** to display all the Format and Sense Keys.

RSP_CODE: It is selected by default. You can click on the dropdown list to select more options.

FCP Task Management

Double-click **FCP Task Management** in the Pattern window to open the Add FCP Task Management Pattern dialog.

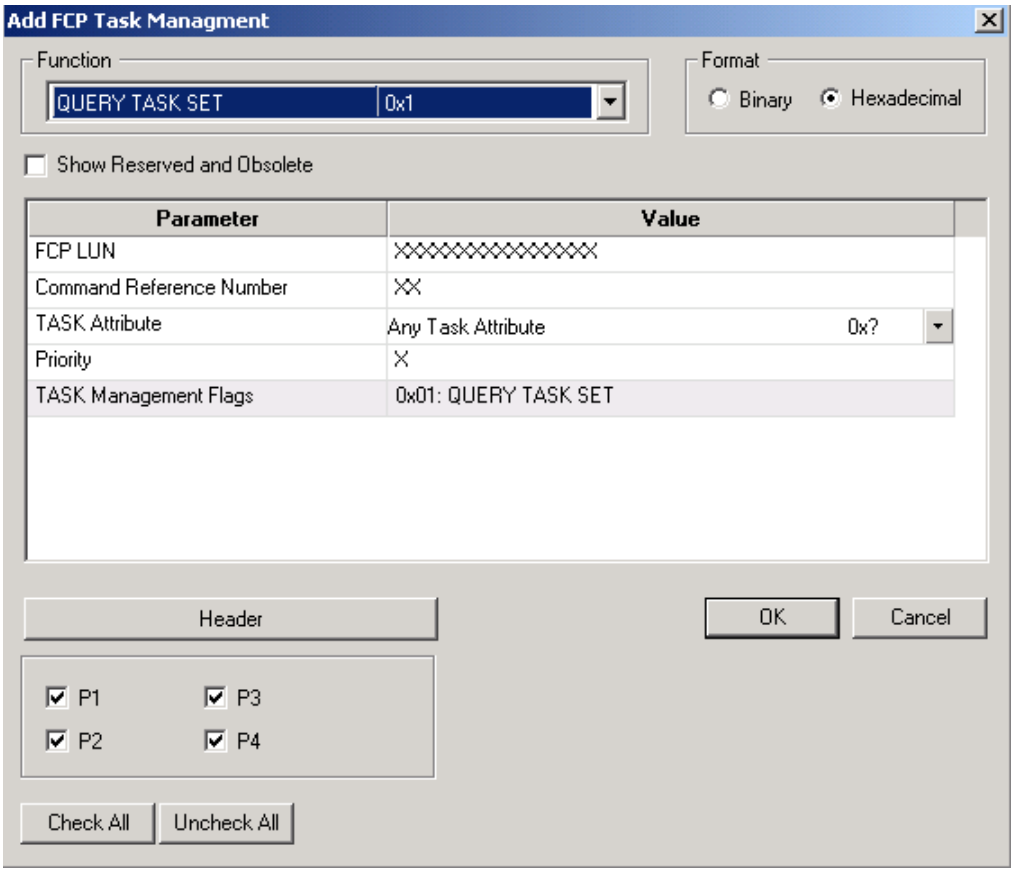


Figure 2.20: FCP Task Management Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Function**, click the dropdown list.

ARB Patterns

ARB Loop Initialization

Double-click **ARB Loop Initialization** in the Pattern window to open the Add ARB Loop Initialization Pattern dialog.

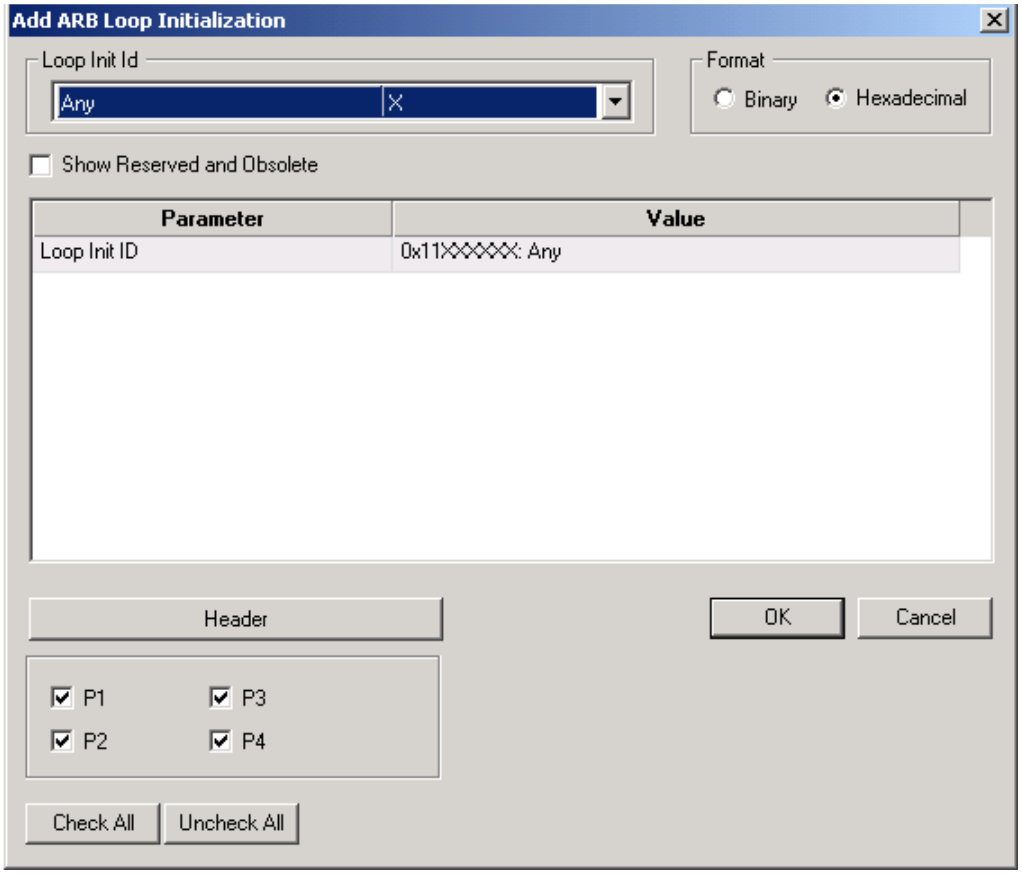


Figure 2.21: ARB Loop Initialization Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a Loop Init ID, click the dropdown list.

ELS Patterns

Extended Link Service - Request

Double-click **Extended Link Service - Request** in the Pattern window to open the Add Extended Link Service Pattern dialog.

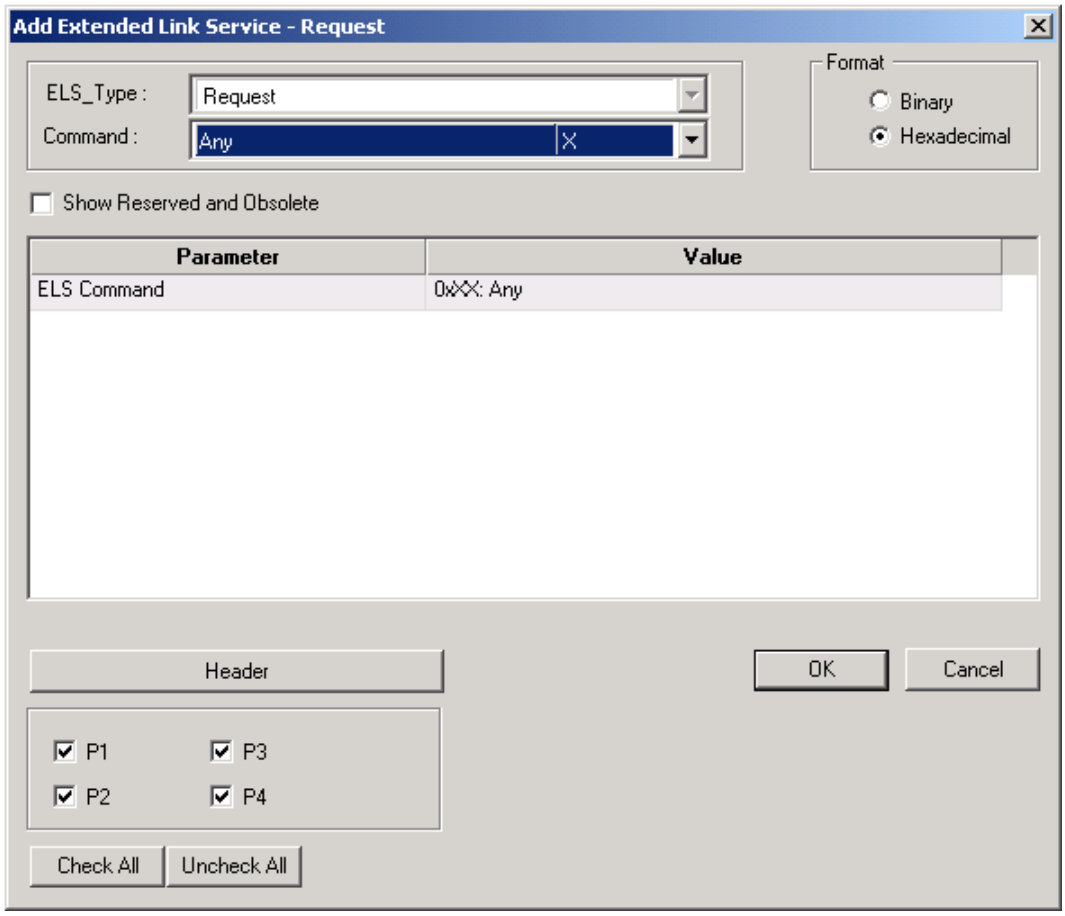


Figure 2.22: Extended Link Service - Request Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select an **ELS_Type**, click the dropdown list.

Extended Link Service - Request, Reply

Double-click **Extended Link Service - Request, Reply** in the Pattern window to open the Add Extended Link Service Pattern dialog.

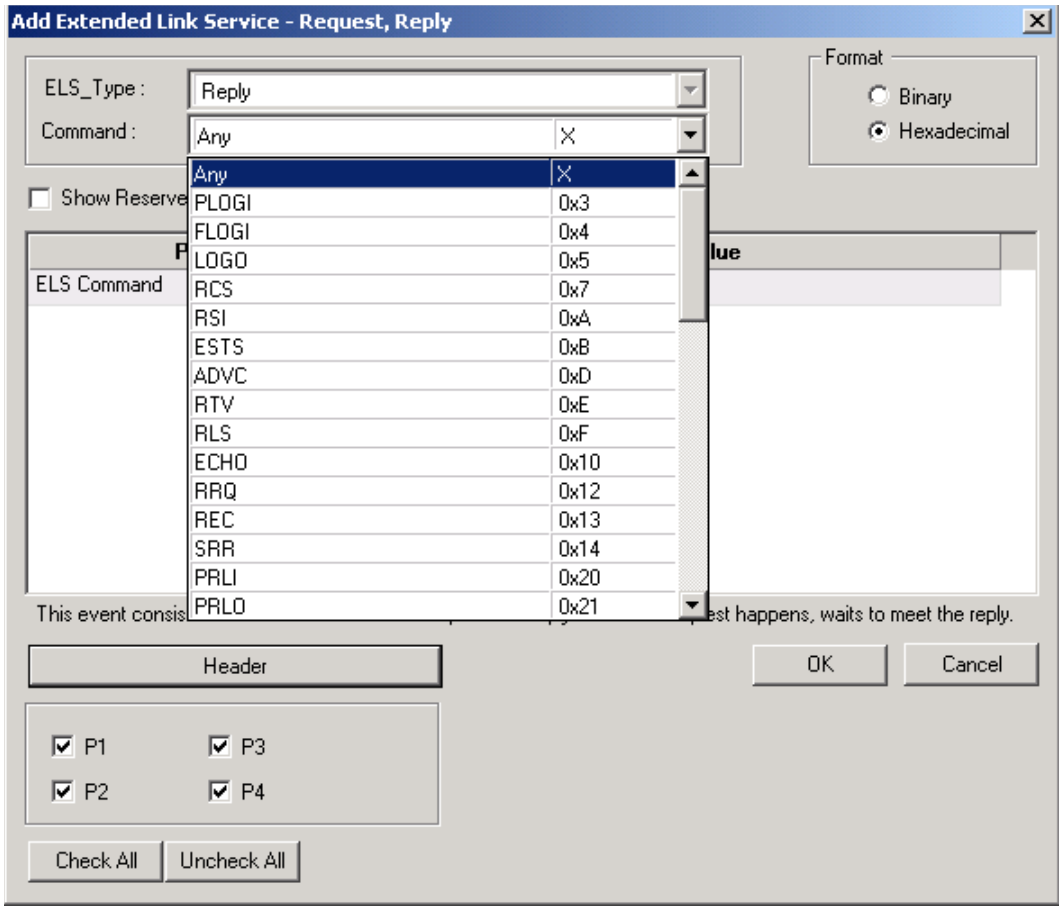


Figure 2.23: Add Extended Link Service - Request, Reply Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select an **ELS_Type**, click the dropdown list.

Extended Link Service - Reply

Double-click **Extended Link Service - Reply** in the Pattern window to open the Add Extended Link Service Pattern dialog.

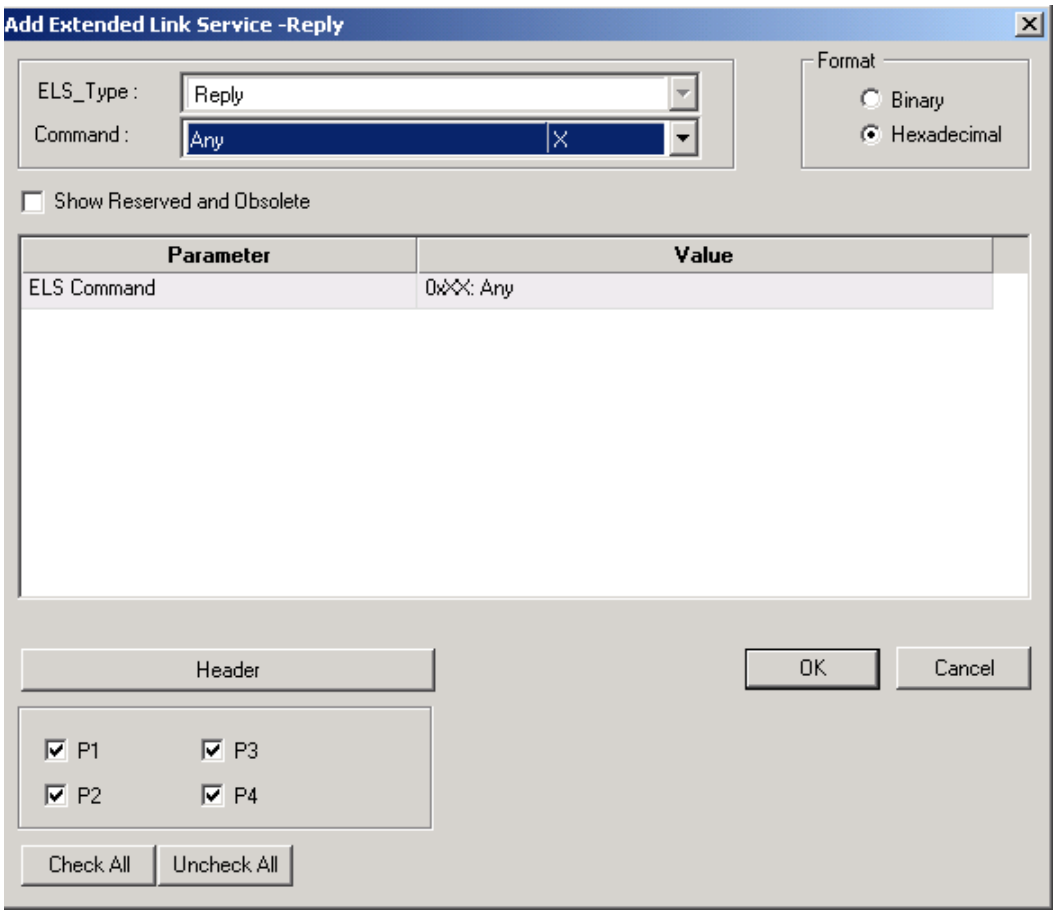


Figure 2.24: Extended Link Service - Reply Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select an **ELS_Type**, click the dropdown list.

GS Patterns

Generic Link Service - Request

Double-click **Generic Link Service - Request** in the Pattern window to open the Add Generic Link Service Pattern dialog.

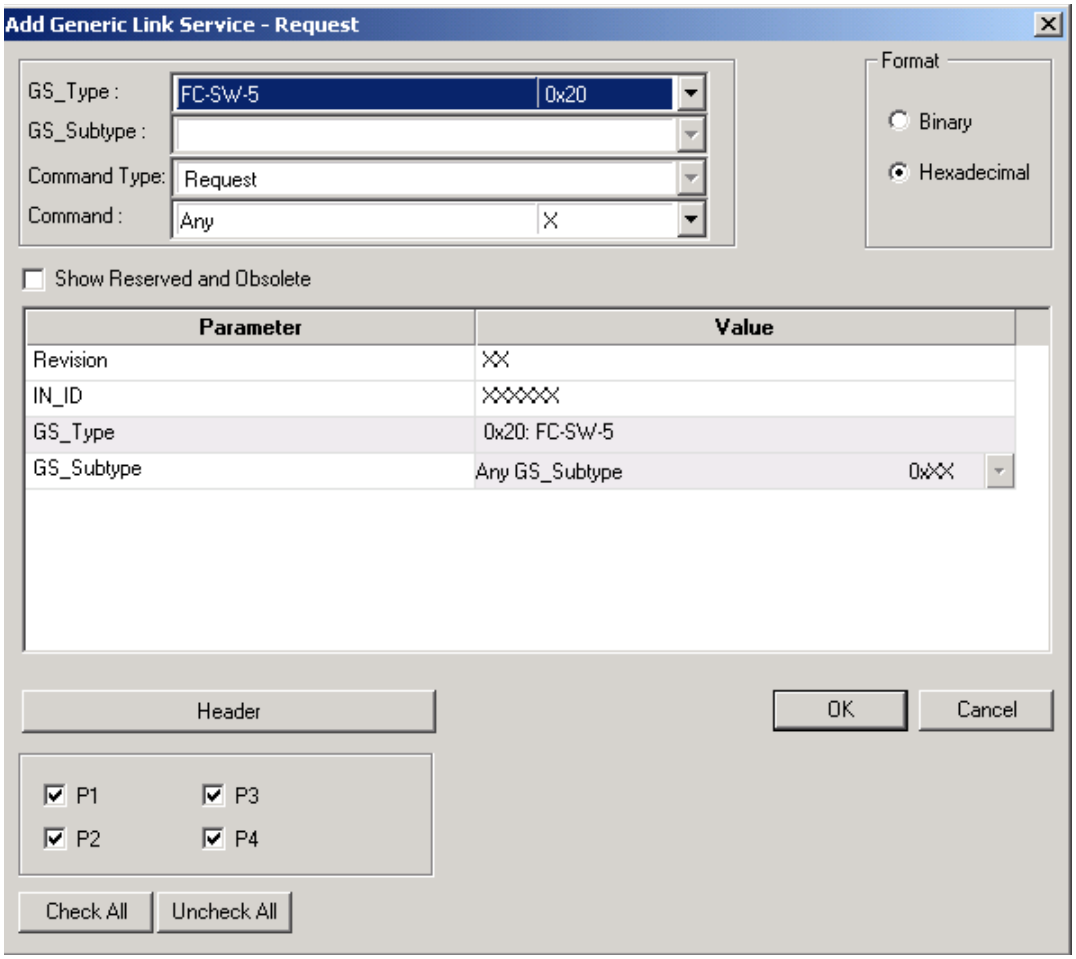


Figure 2.25: Generic Link Service Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

Click the dropdown lists to select a **GS_Type**, **GS_Subtype**, **Command Type**, and **Command**.

Generic Link Service - Request, Reply

Double-click **Generic Link Service - Request, Reply** in the Pattern window to open the Add Generic Link Service Pattern dialog.

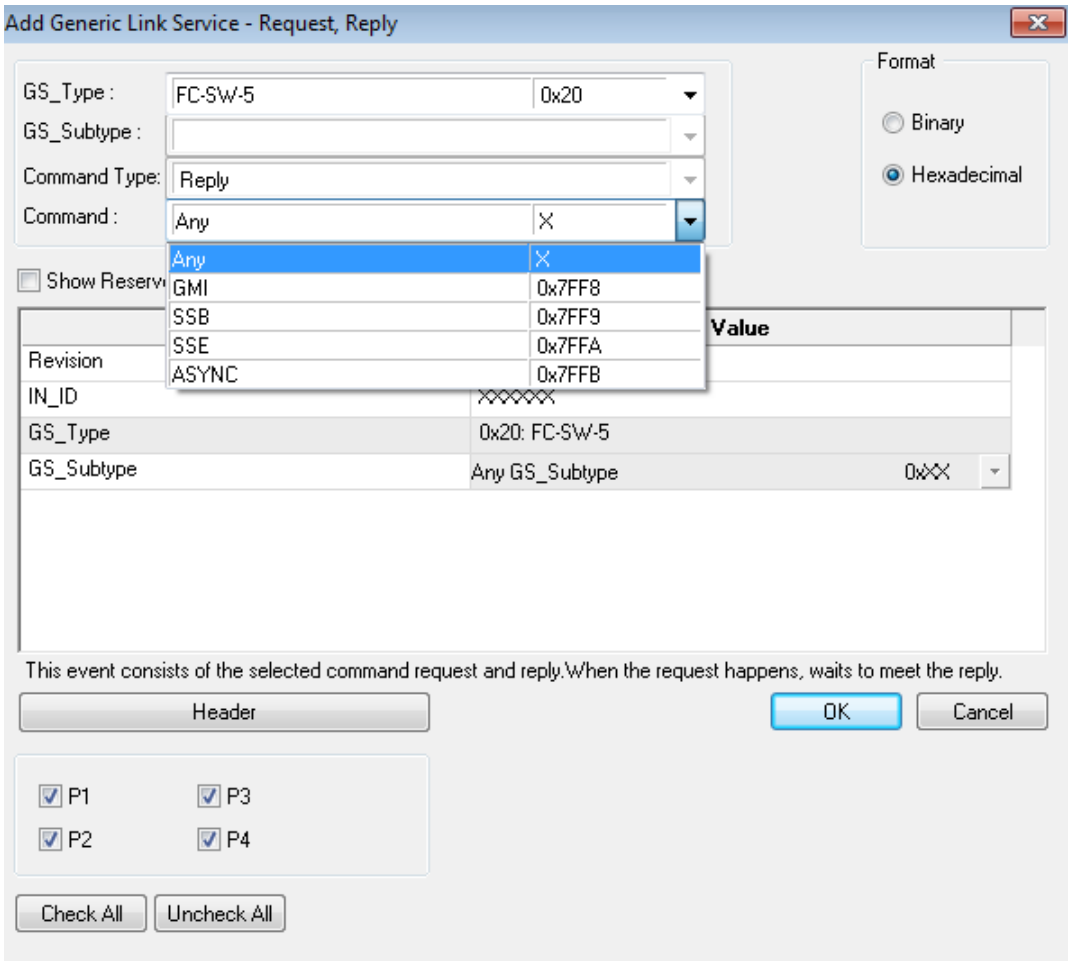


Figure 2.26: Generic Link Service-Request, Reply Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

Click the dropdown lists to select a **GS_Type**, **GS_Subtype**, **Command Type**, and **Command**.

Generic Link Service - Reply

Double-click **Generic Link Service - Reply** in the Pattern window to open the Add Generic Link Service Pattern dialog.

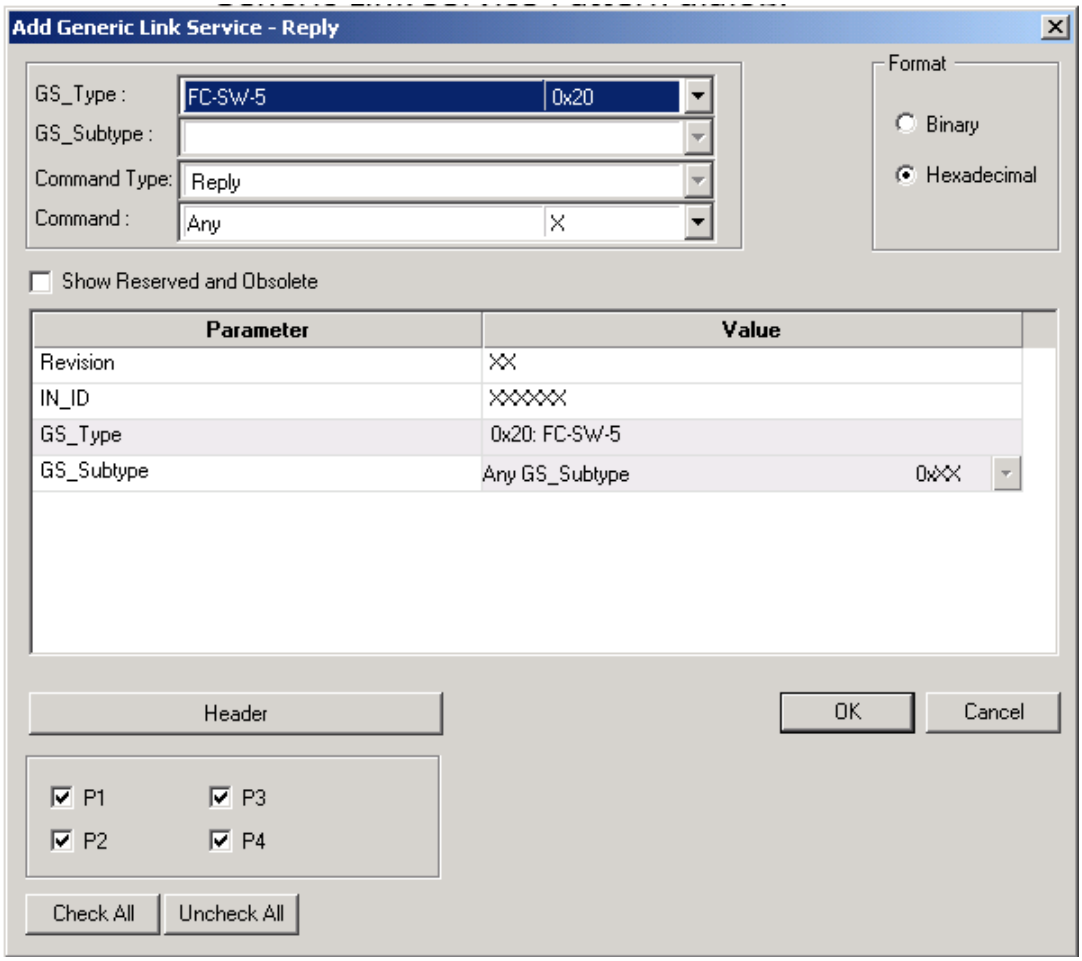


Figure 2.27: Generic Link Service Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

Click the dropdown lists to select a **GS_Type**, **GS_Subtype**, **Command Type**, and **Command**.

SW Patterns

Switch Internal Link Service - Request

Double-click **Switch Internal Link Service - Request** in the Pattern window to open the Add Switch Internal Link Service Pattern dialog.

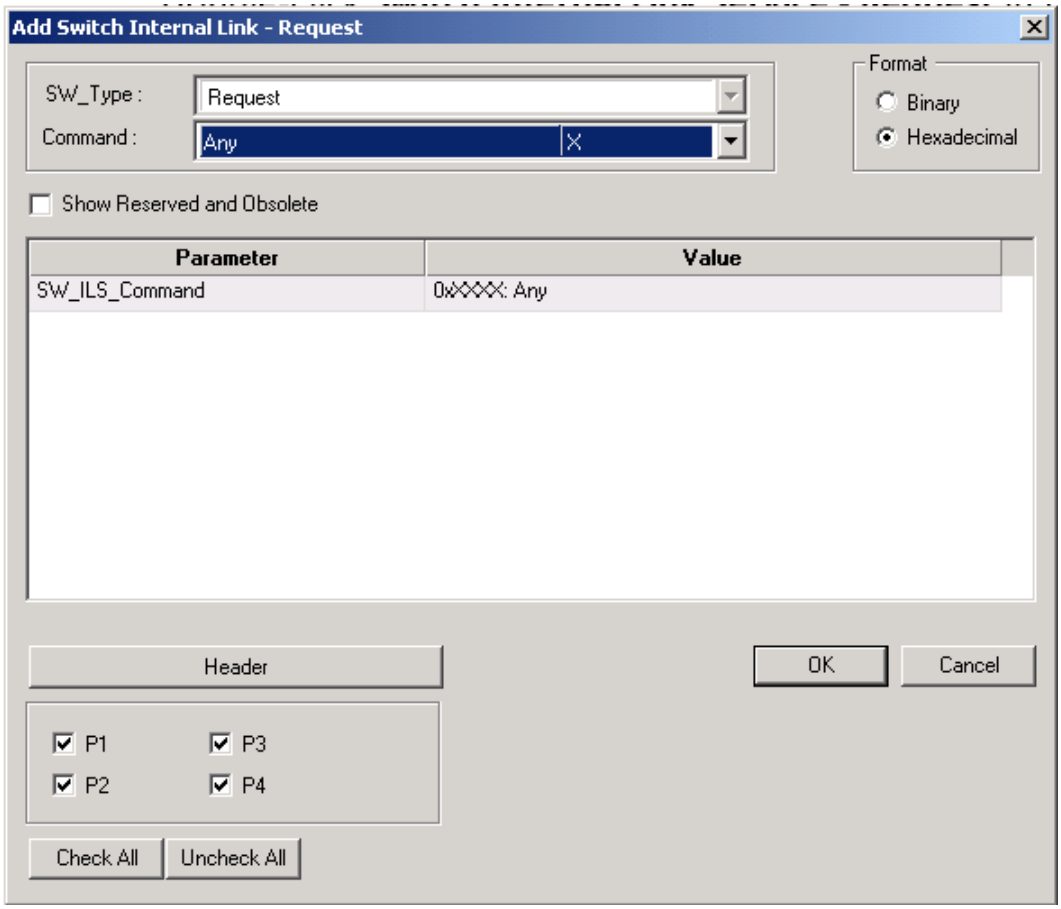


Figure 2.28: Switch Internal Link Service Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **SW_Type** and a **Command**, click the dropdown lists.

Switch Internal Link Service - Request, Reply

Double-click **Switch Internal Link Service - Request, Reply** in the Pattern window to open the Add Switch Internal Link Service Pattern dialog.

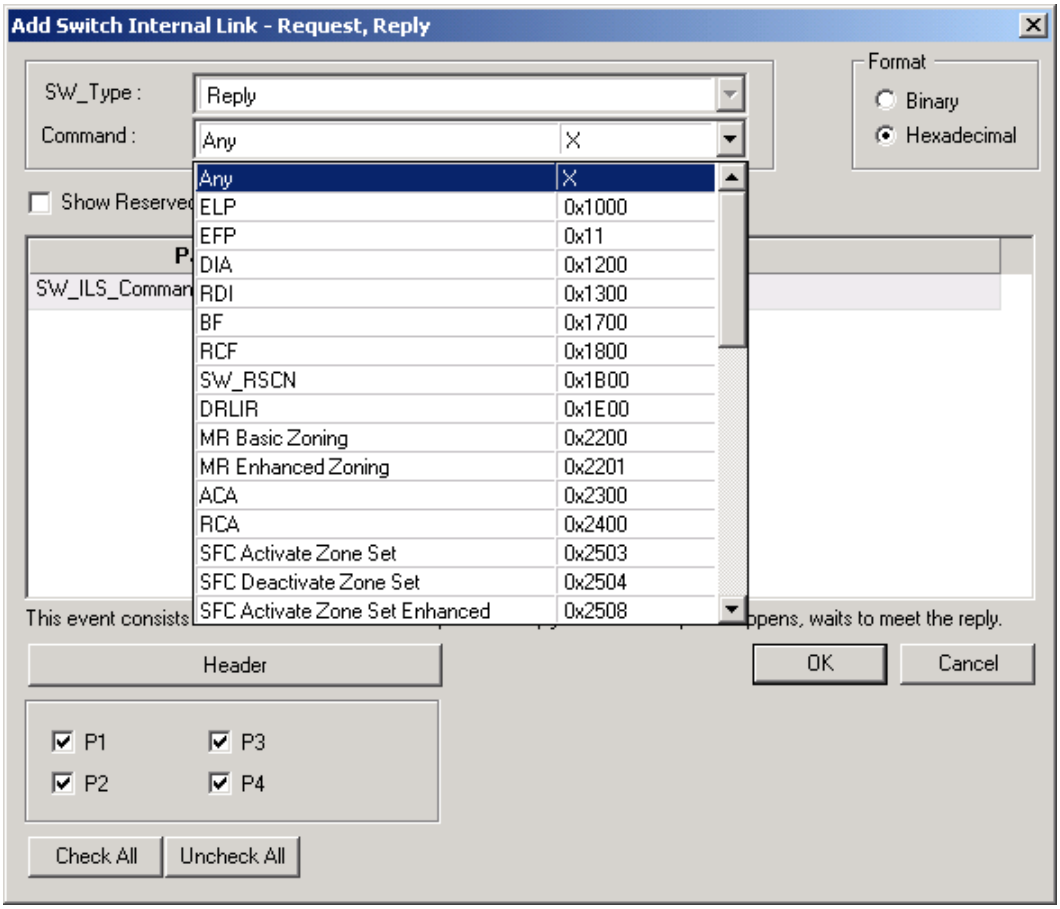


Figure 2.29: Switch Internal Link Service-Request, Reply Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **SW_Type** and a **Command** click the dropdown lists.

Switch Internal Link Service - Reply

Double-click **Switch Internal Link Service - Reply** in the Pattern window to open the Add Switch Internal Link Service Pattern dialog.

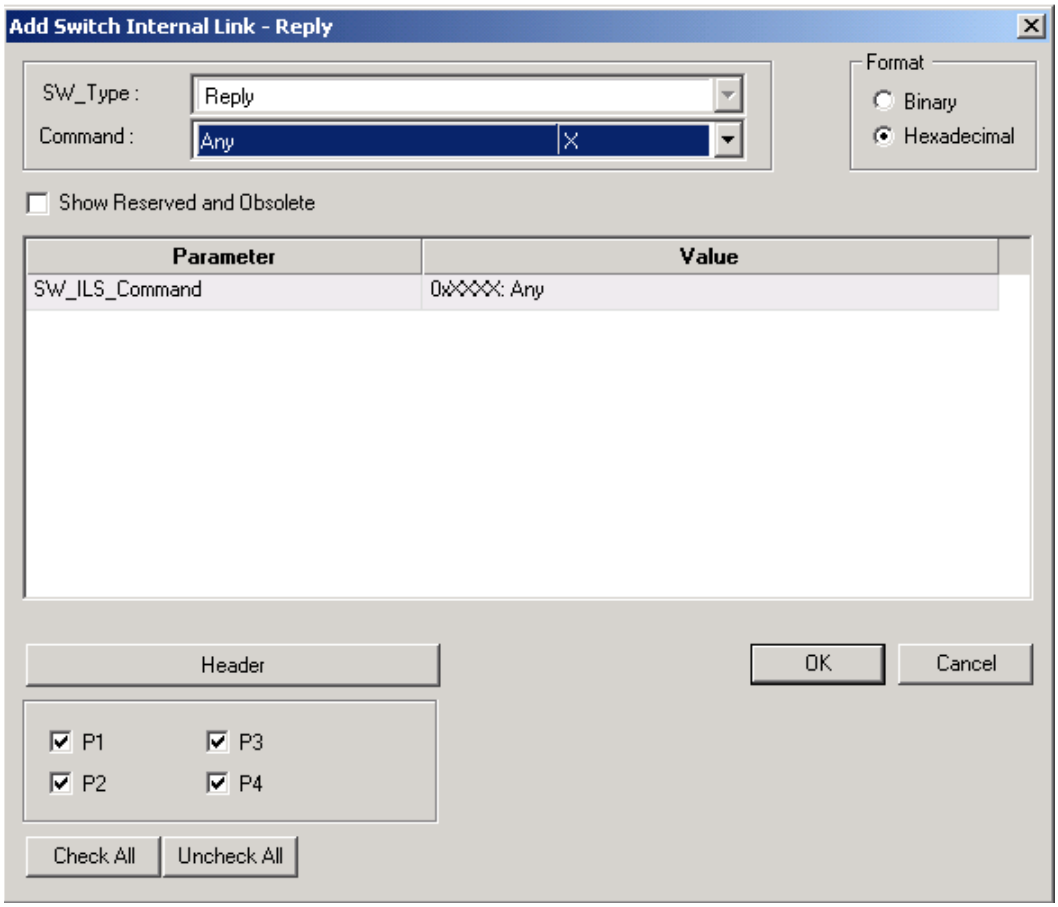


Figure 2.30: Switch Internal Link Service Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **SW_Type** and a **Command** click the dropdown lists.

FICON

Any Data Information Block Type

Double-click **FICON - (Any Data Information Block Type)** in the Patterns Library panel to open the FICON - Any Data Information Block Type dialog.

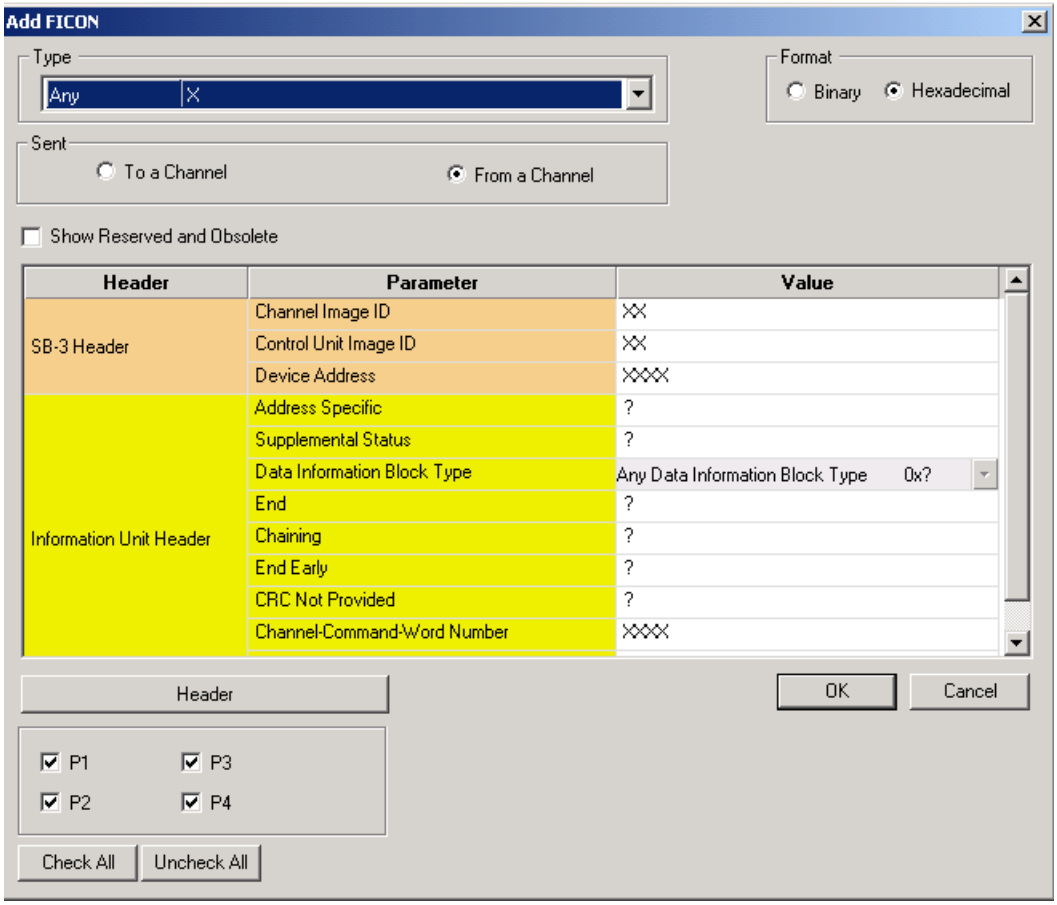


Figure 2.31: FICON - (Any Data Information Block Type) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

Add FICON Data

Double-click **FICON(Data)** in the Patterns Library panel to open the FICON Data dialog.

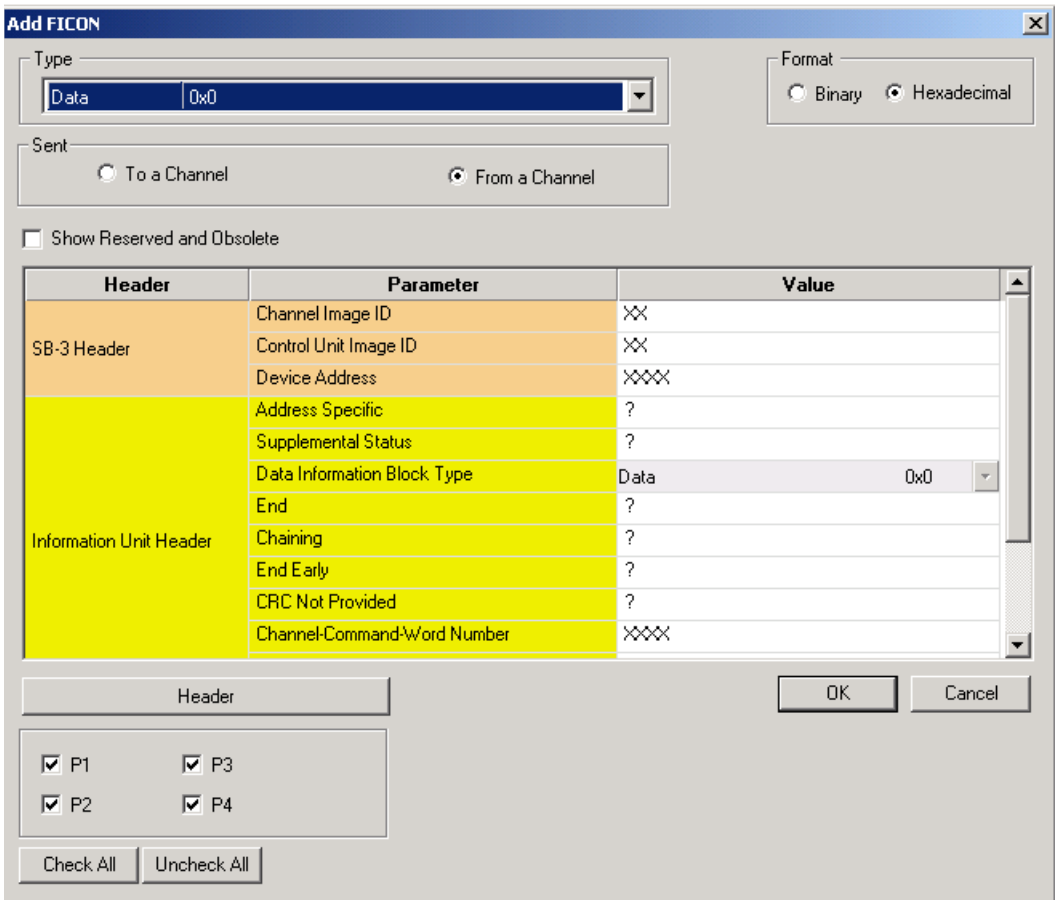


Figure 2.32: FICON (Data) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

Add FICON Command

Double-click **FICON(Command)** in the Patterns Library panel to open the FICON Command dialog.

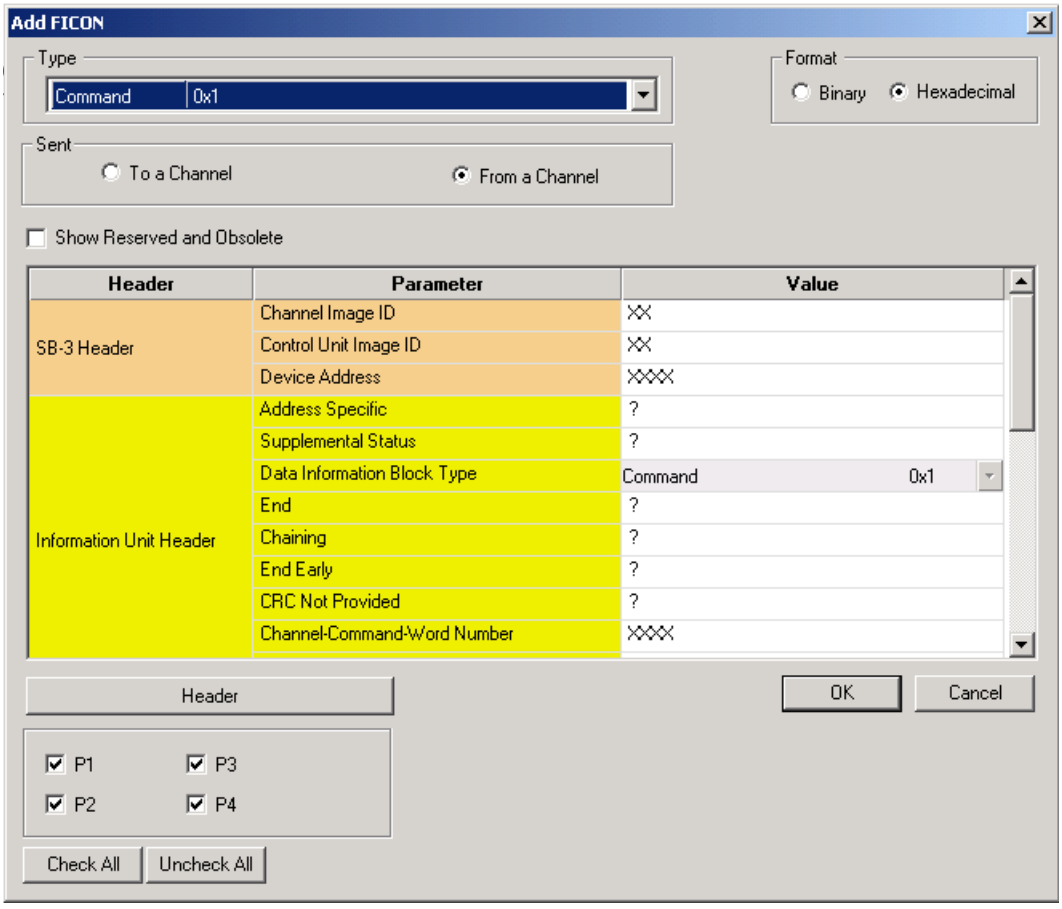


Figure 2.33: FICON (Command) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

FICON[Command]-CCW Command Type

The FICON[Command] has an additional **CCW Command Type** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

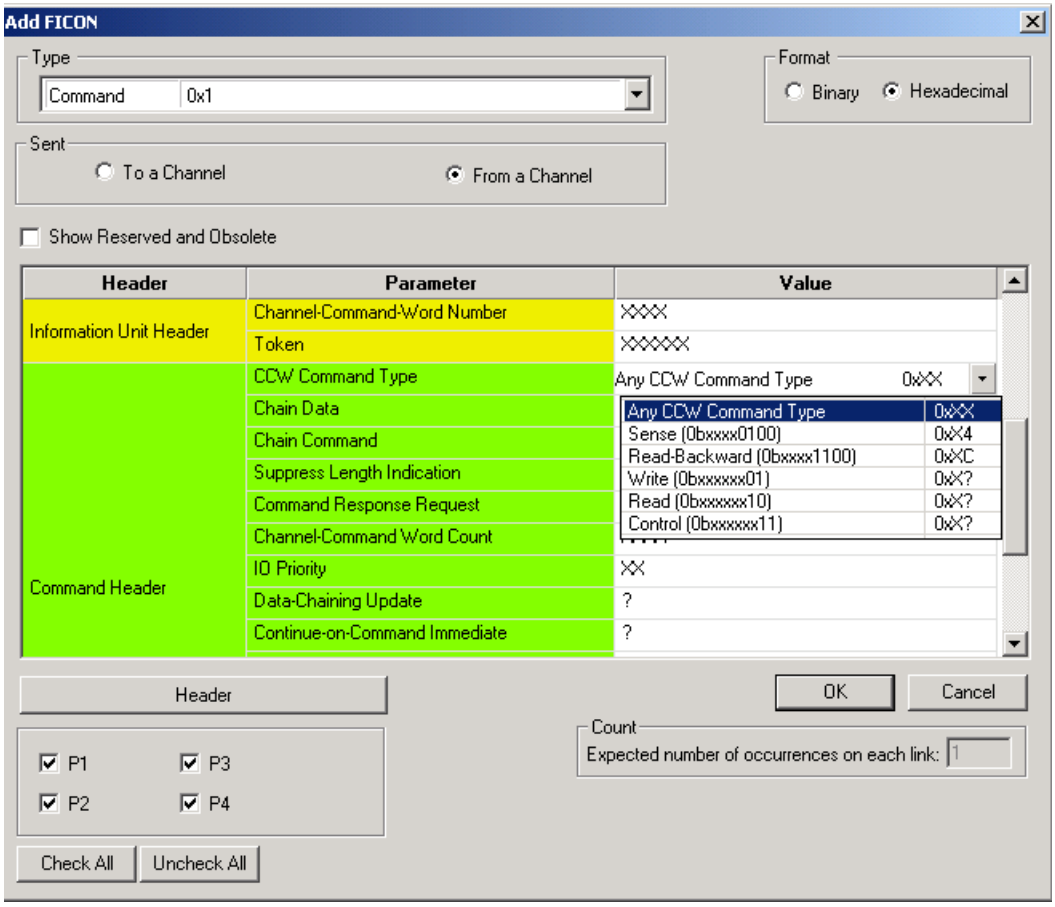


Figure 2.34: FICON[Command] - CCW Command Type Dialog

To select **CCW Command Type** click the dropdown list which has the following options:

- Any CCW Command Type
- Sense
- Read-Backward
- Write
- Read
- Control

Add FICON Status

Double-click **FICON(Status)** in the Patterns Library panel to open the FICON Status dialog.

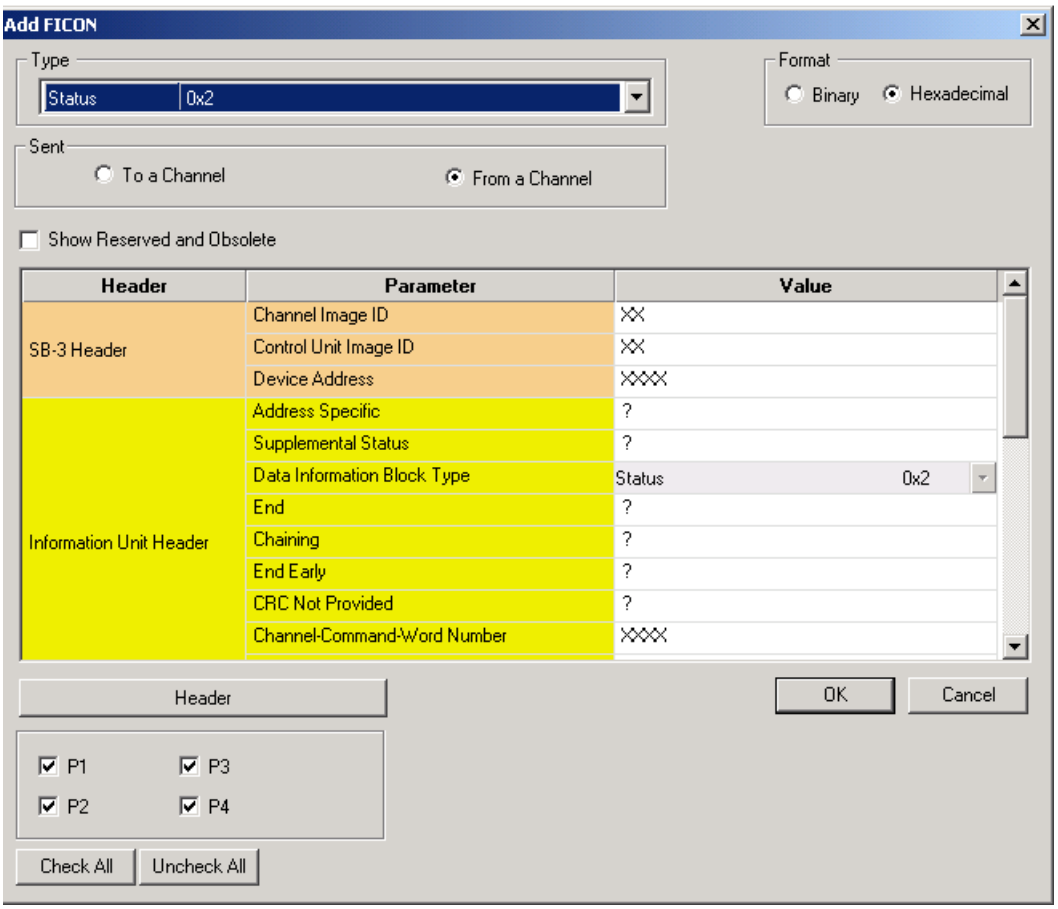


Figure 2.35: FICON (Status) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

FICON[Status]- Flag-Field Code

The FICON[Status] has an additional **Flag-Field Code** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

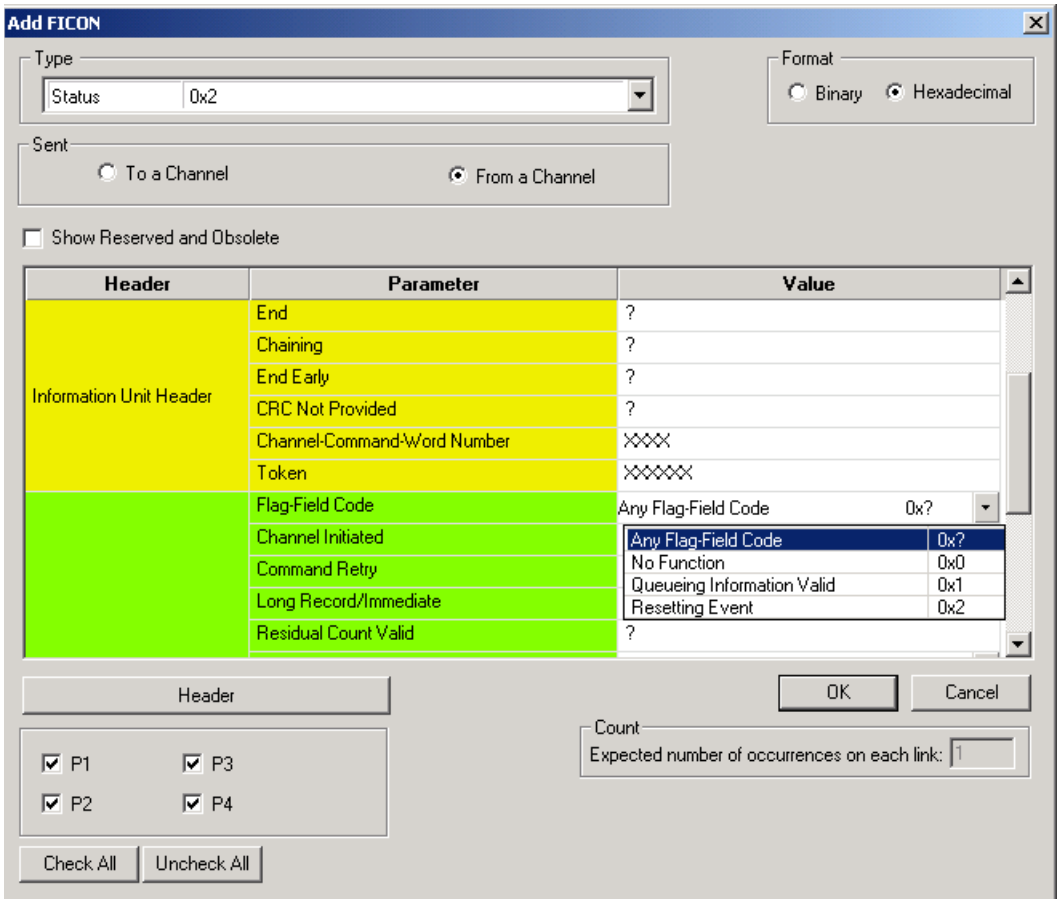


Figure 2.36: FICON[Status] - Any Flag-Field Code Dialog

To select **Flag-Field Code** click the dropdown list which has the following options:

- Any Flag-Field Code
- No Function
- Queueing Information Valid
- Resetting Event

FICON[Status]-Status Byte

The FICON[Status] has an additional **Status Byte** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

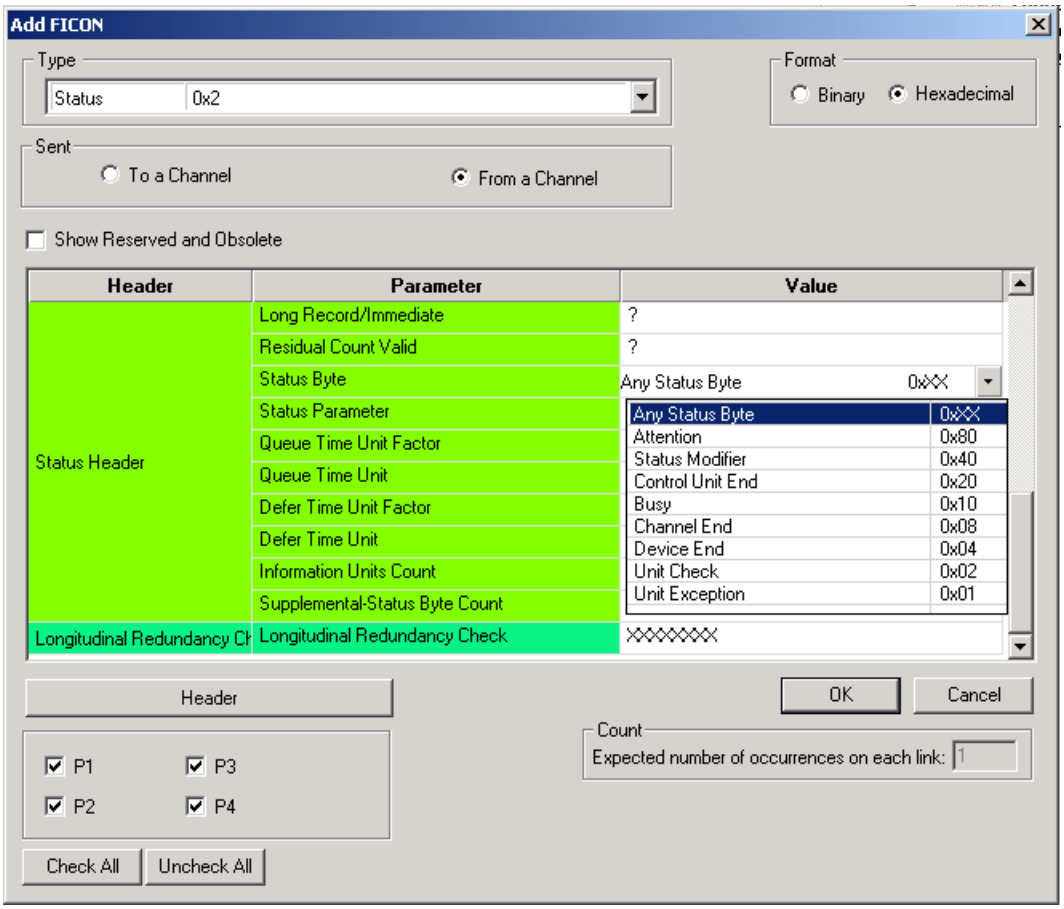


Figure 2.37: FICON[Status] - Status Byte Dialog

To select **Status Byte** click the dropdown list which has the following options:

- Any Status Byte
- Attention
- Status Modifier
- Control Unit End
- Busy
- Channel End
- Device End
- Unit Check
- Unit Exception

Add FICON Control

Double-click **FICON(Control)** in the Patterns Library panel to open the FICON Control dialog.

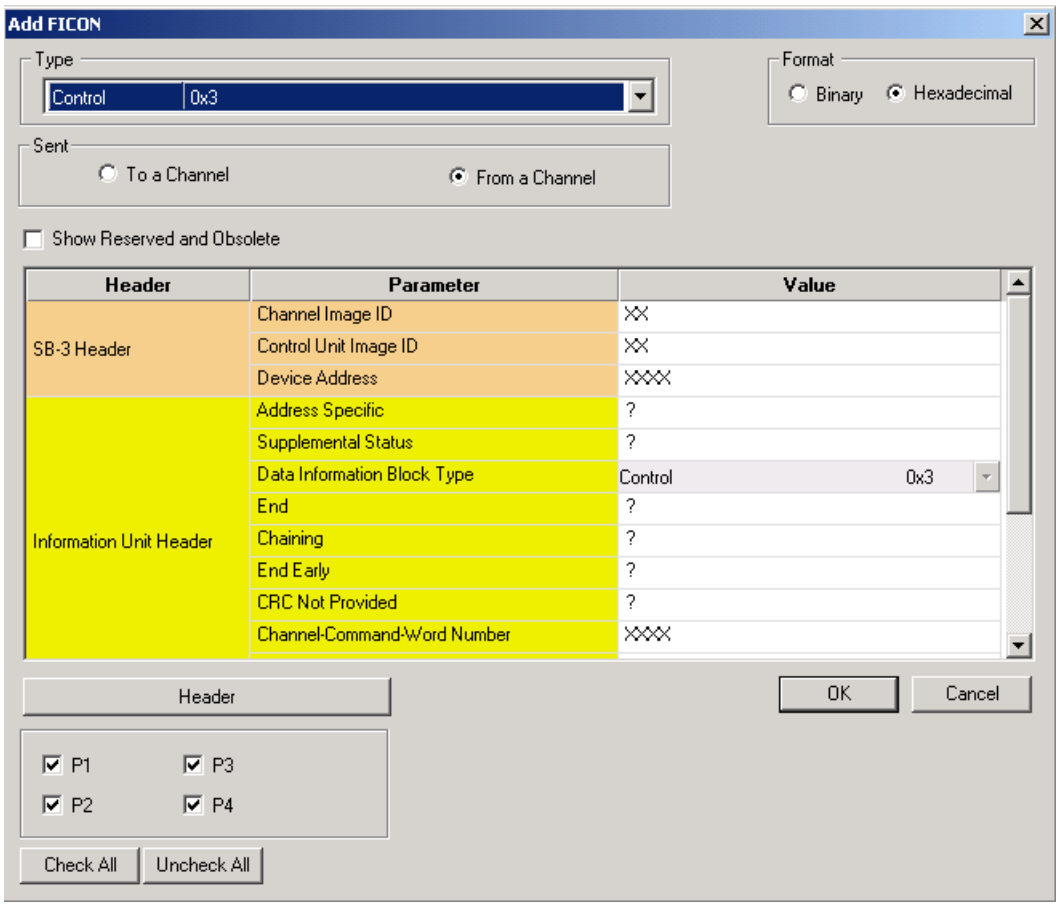


Figure 2.38: FICON (Control) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

FICON[Control]-Control Function

The FICON[Control] has an additional **Control Function** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

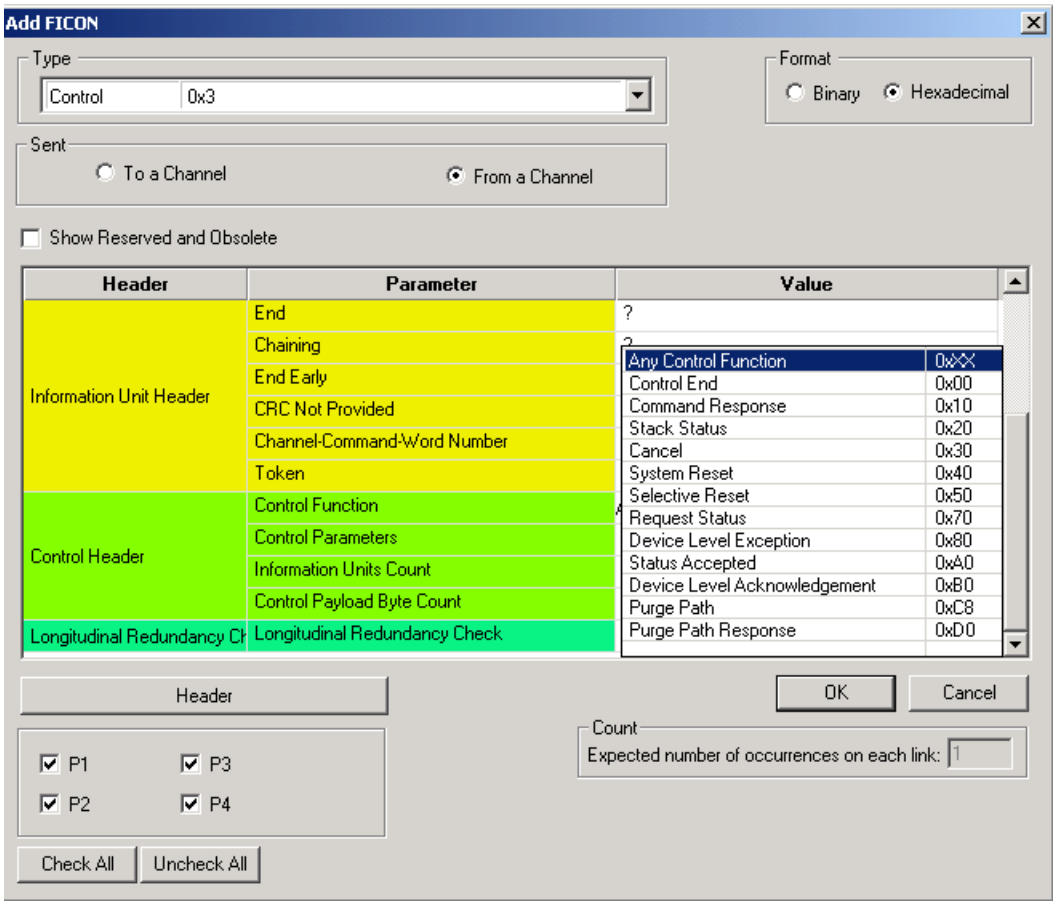


Figure 2.39: FICON[Control] - Control Function Dialog

To select **Control Function** click the dropdown list which has the following options:

- Any Control Function
- Control End
- Command Response
- Stack Status
- cancel
- System Request
- Selective Reset
- Request Status
- Device Level Exception
- Status Accepted
- Device Level Acknowledgement
- Purge Path
- Purge Path Response

Add FICON Command-Data

Double-click **FICON(Command-Data)** in the Patterns Library panel to open the FICON Command Data dialog.

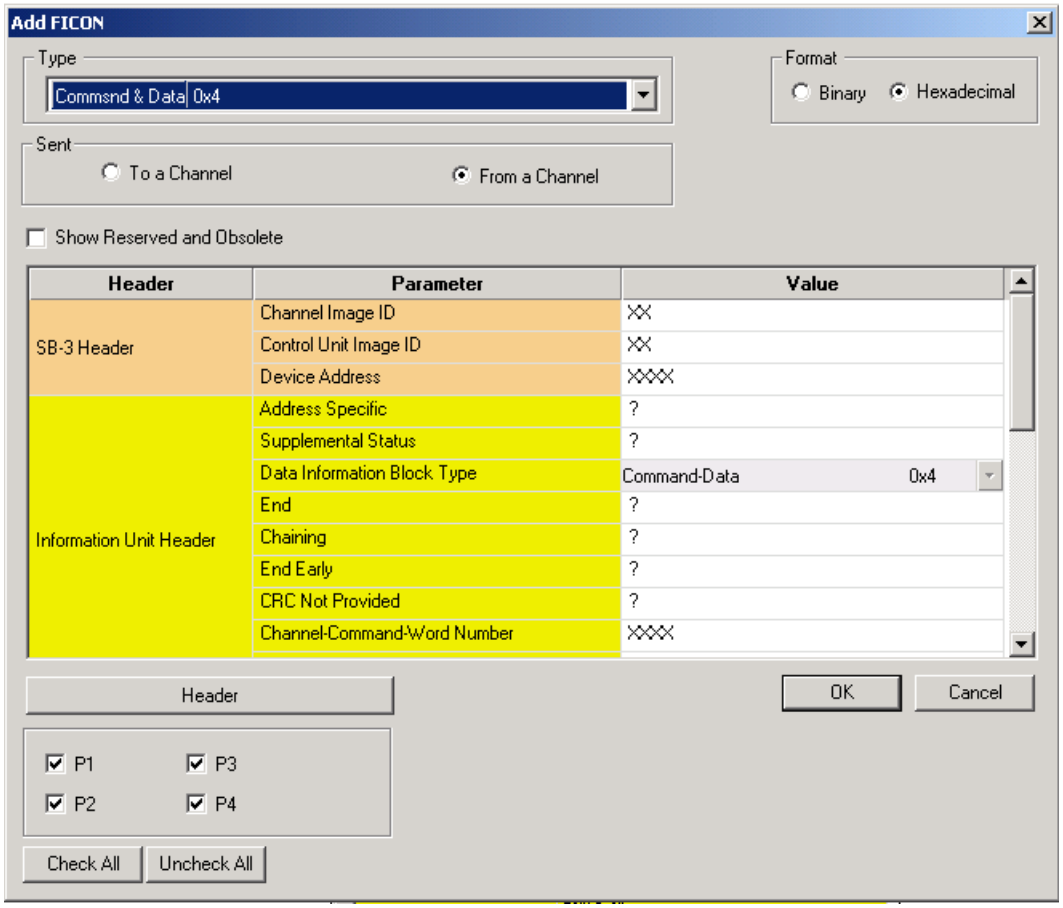


Figure 2.40: FICON (Command Data) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

FICON[Command]-CCW Command Type

The FICON[Command-Data] has an additional **CCW Command Type** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

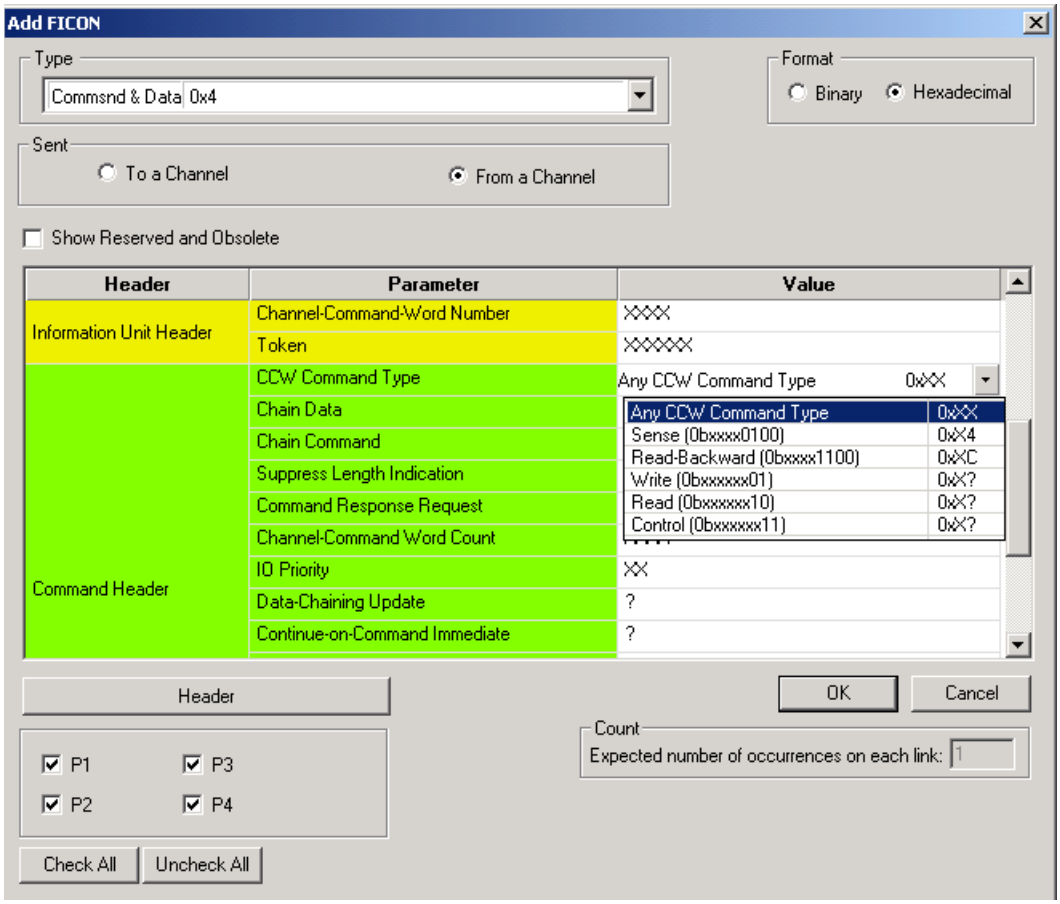


Figure 2.41: FICON[Command-Data] - CCW Command Type Dialog

To select **CCW Command Type** click the dropdown list which has the following options:

- Any CCW Command Type
- Sense
- Read-Backward
- Write
- Read
- Control

Add FICON Link-Control

Double-click **FICON(Link-Control)** in the Patterns Library panel to open the FICON Link Control dialog.

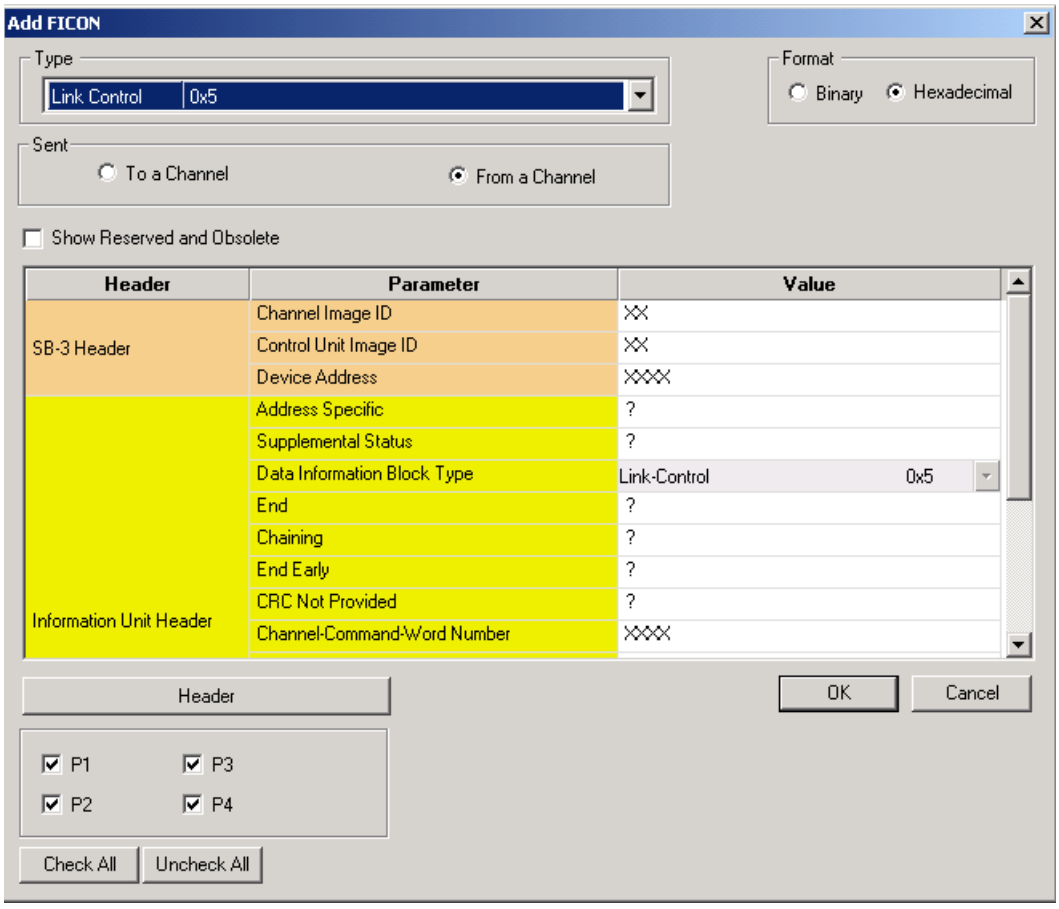


Figure 2.42: FICON (Link-Control) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

FICON[Link Control]-Link Control Function

The FICON[Link Control] has an additional **Link Control Function** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

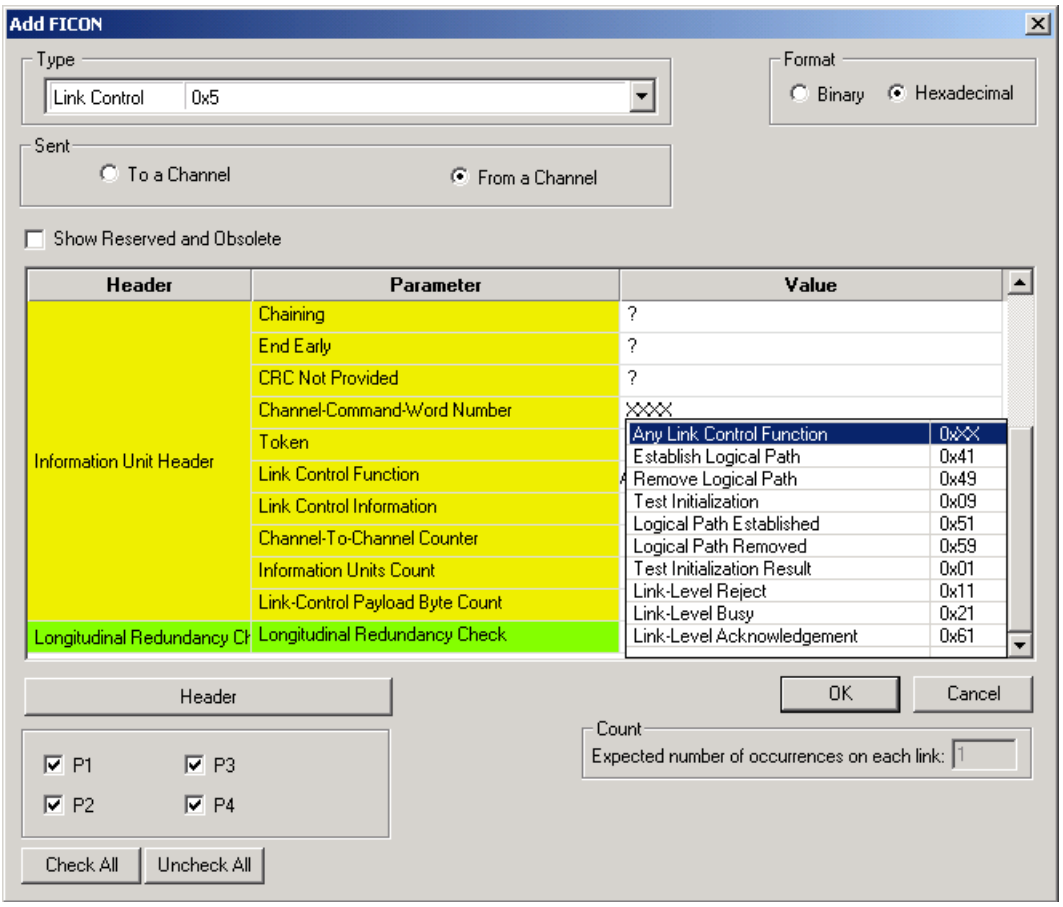


Figure 2.43: FICON[Link Control] - Link Control Function Dialog

To select **Link Control Function** click the dropdown list which has the following options:

- Any Link Control Function
- Establish Logical Path
- Remove Logical Path
- Test Initialization
- Logical Path Established
- Logical Path Removed
- Test Initialization Result
- Link-Level Reject
- Link-Level Busy
- Link-Level Acknowledgement

FCAE

FCAE-ASM

Double-click **FCAE-ASM** in the Patterns Library panel to open the FCAE-ASM dialog to add any Type of FCAE-ASM.

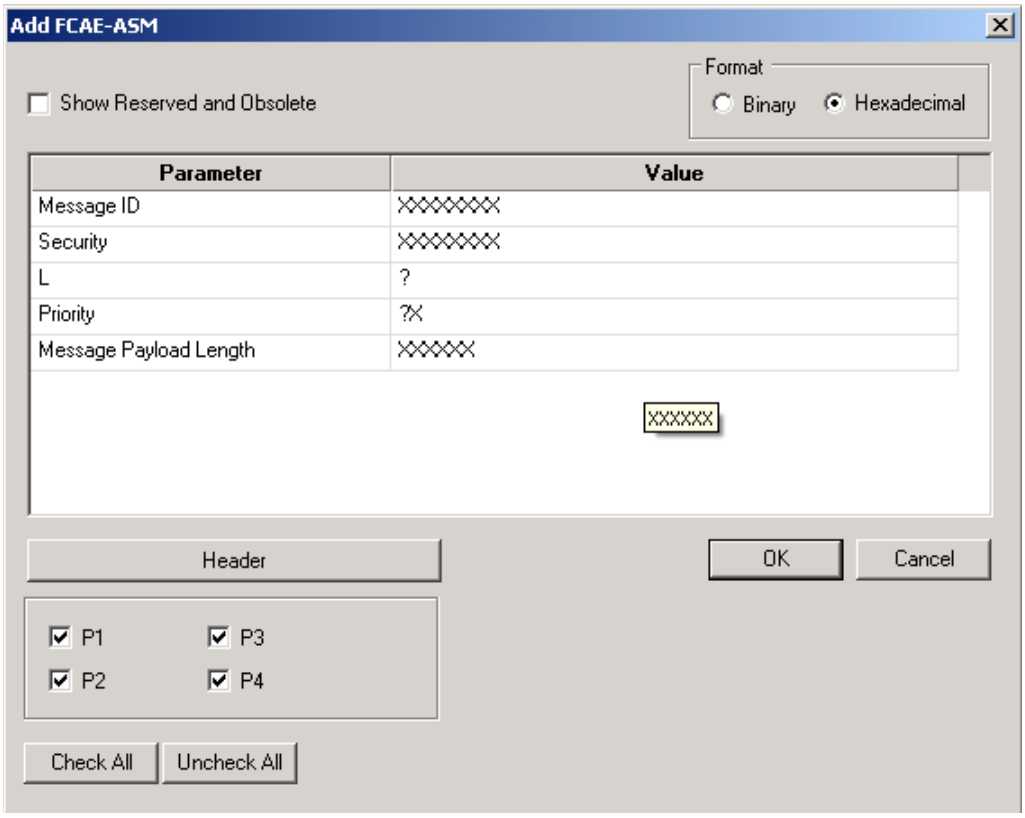


Figure 2.44: FCAE-ASM Dialog

The format can be **Binary** or **Hexadecimal**.

FCAE-1553 Any

Double-click **FCAE-1553(Any)** in the Patterns Library panel to open the FCAE-1553 dialog to add any Type of FCAE-1553.

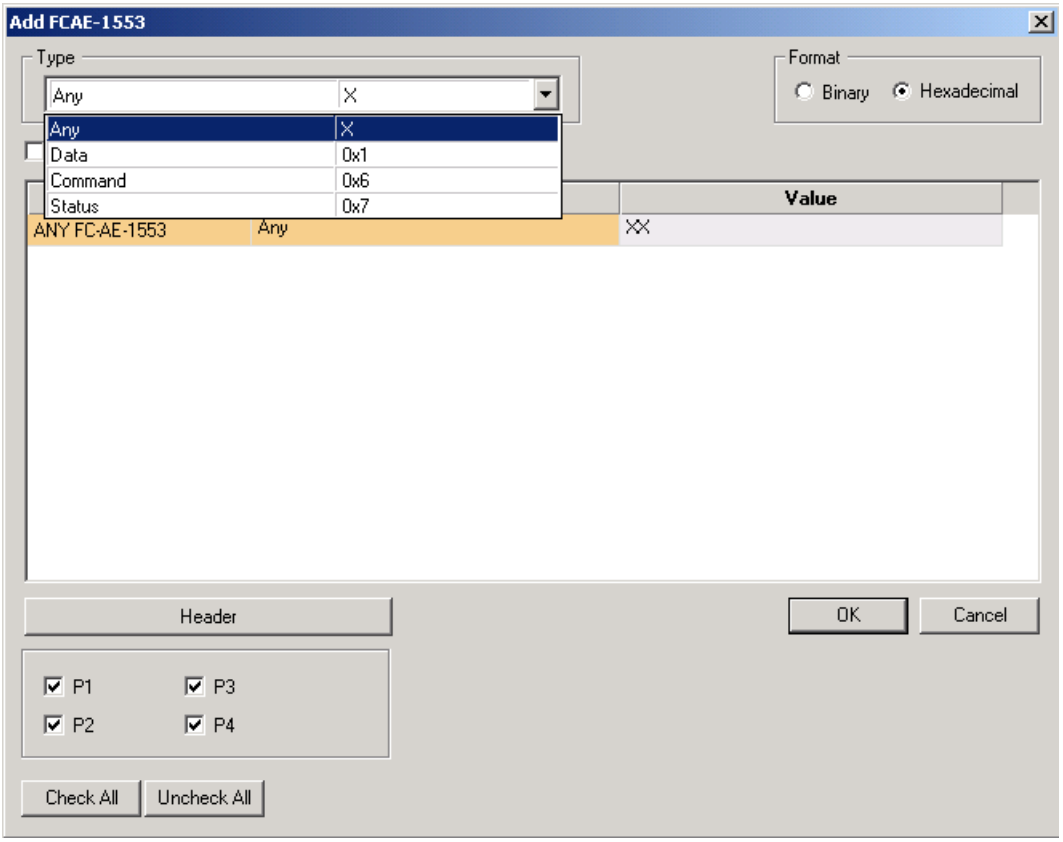


Figure 2.45: FCAE-1553 (Any) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status

Add FCAE-1553 Data

Double-click **FCAE-1553(Data)** in the Patterns Library panel to open the FCAE-1553 Data dialog.

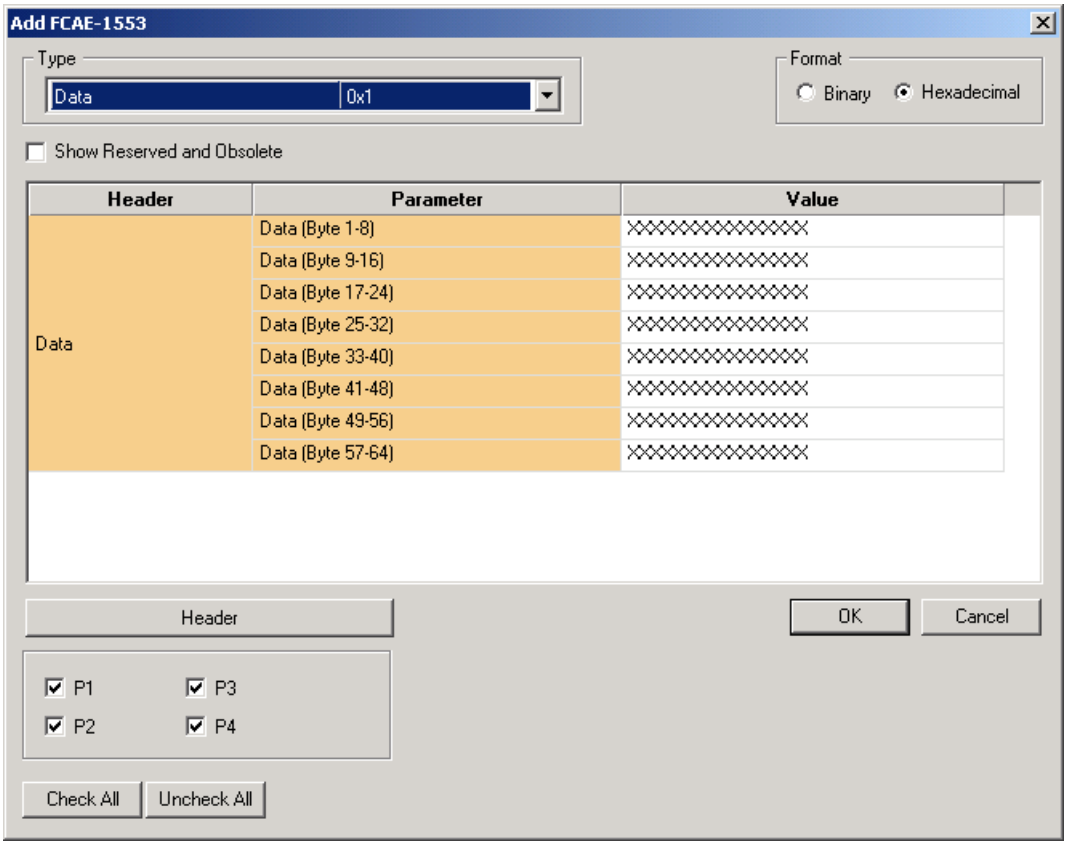


Figure 2.46: FCAE-1553(Data) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status

Add FCAE-1553 Command

Double-click **FCAE-1553(Command)** in the Patterns Library panel to open the FCAE-1553 Command dialog.

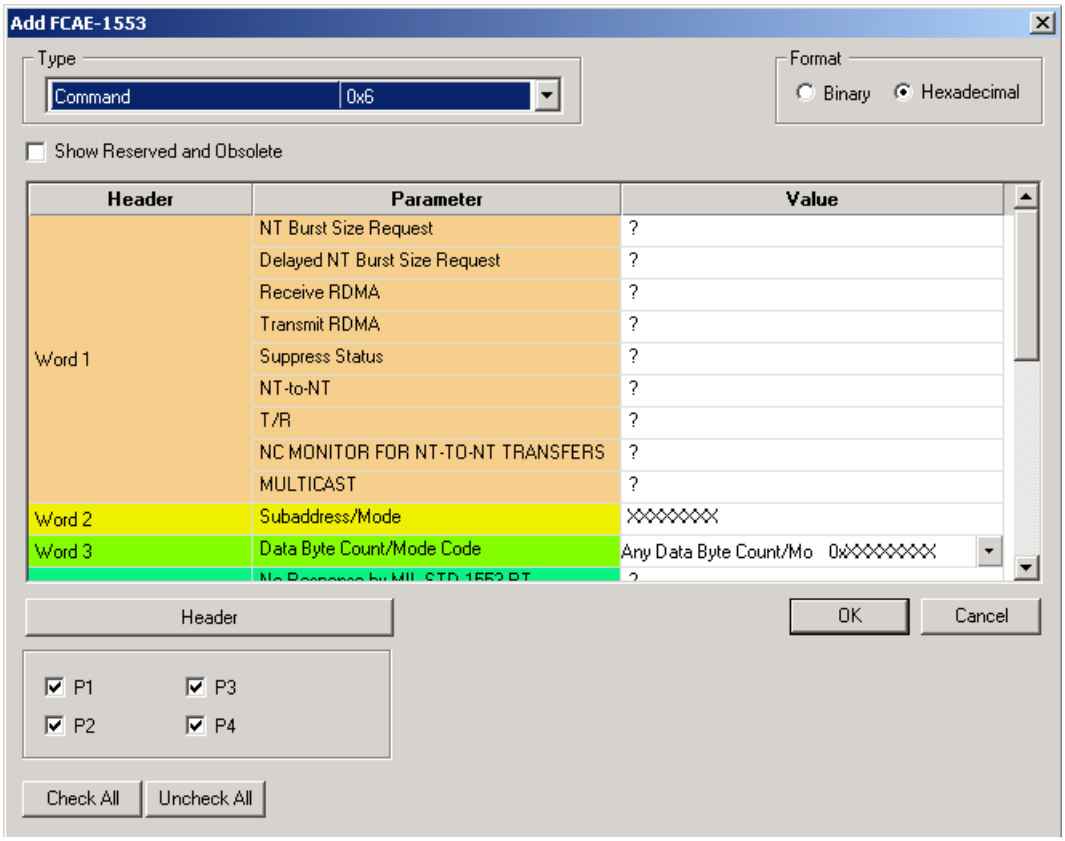


Figure 2.47: FCAE-1553 (Command) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status

FCAE-1553[Command]-Data Byte Count /Mode Code

The FCAE-1553[Command] has an additional **Data Byte Count /Mode Code** dropdown menu under the **Value** pane on the right of the dialog as shown in Figure 2.46. The dropdown menu items could be truncated, hover the mouse over the option to see the full menu option (see the following figure).

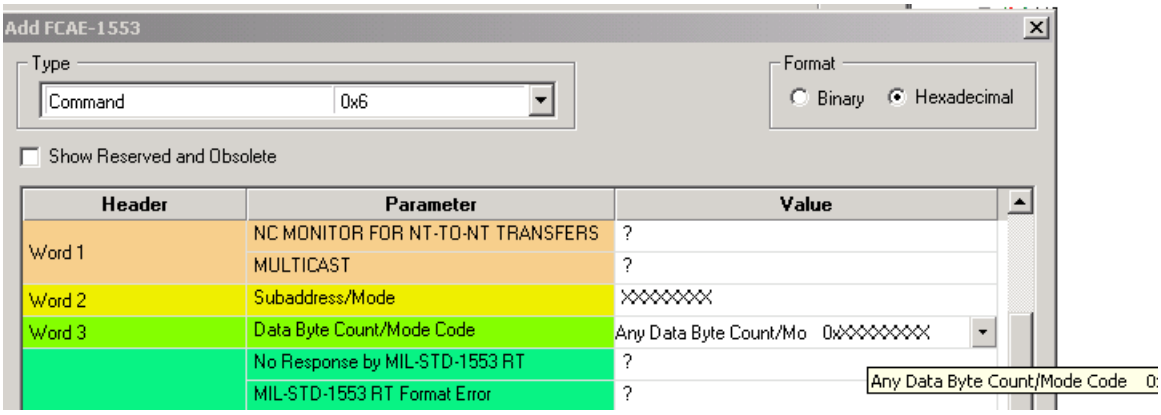


Figure 2.48: Hover the Mouse to see the Full Menu Option

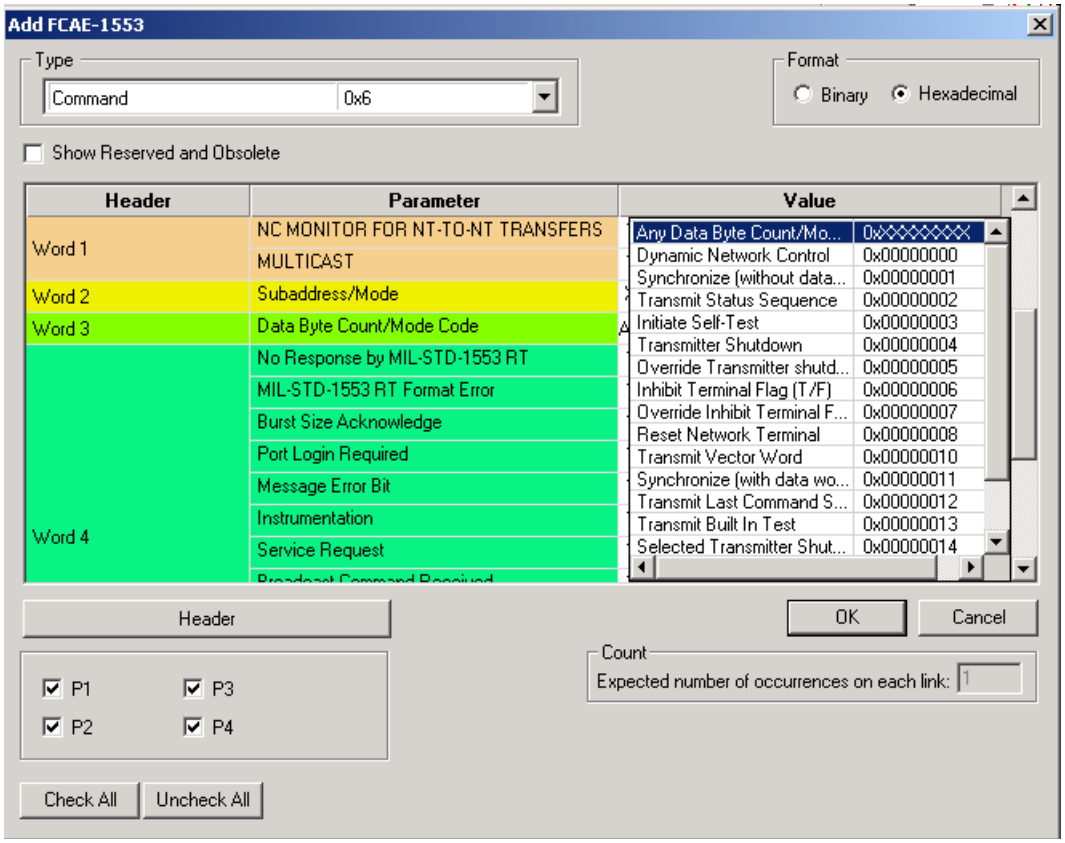


Figure 2.49: FCAE-1553[Command]- Data Byte Count/Mode Code Dialog

To select **Data Byte Count/Mode Code** click the dropdown list which has the following options:

- Any Data Byte Count/Mode Code
- Dynamic Network Control
- Synchronize (without data word)
- Transmit Status Sequence
- Initiate Self-Test
- Transmitter Shutdown
- Override Transmitter shutdown
- Inhibit Terminal Flag (T/F)
- Override Inhibit Terminal Flag
- Reset Network Terminal
- Transmit Vector Word
- Synchronize (with data word)
- Transmit Last Command Sequence
- Transmit Built In test
- Selected Transmitter Shutdown
- Override Selected Transmitter Shutdown
- Transmit RT Address
- Transmit NT_C-D/S_BURST_TOV

Add FCAE-1553 Status

Double-click **FCAE-1553(Status)** in the Patterns Library panel to open the FCAE-1553 Status dialog.

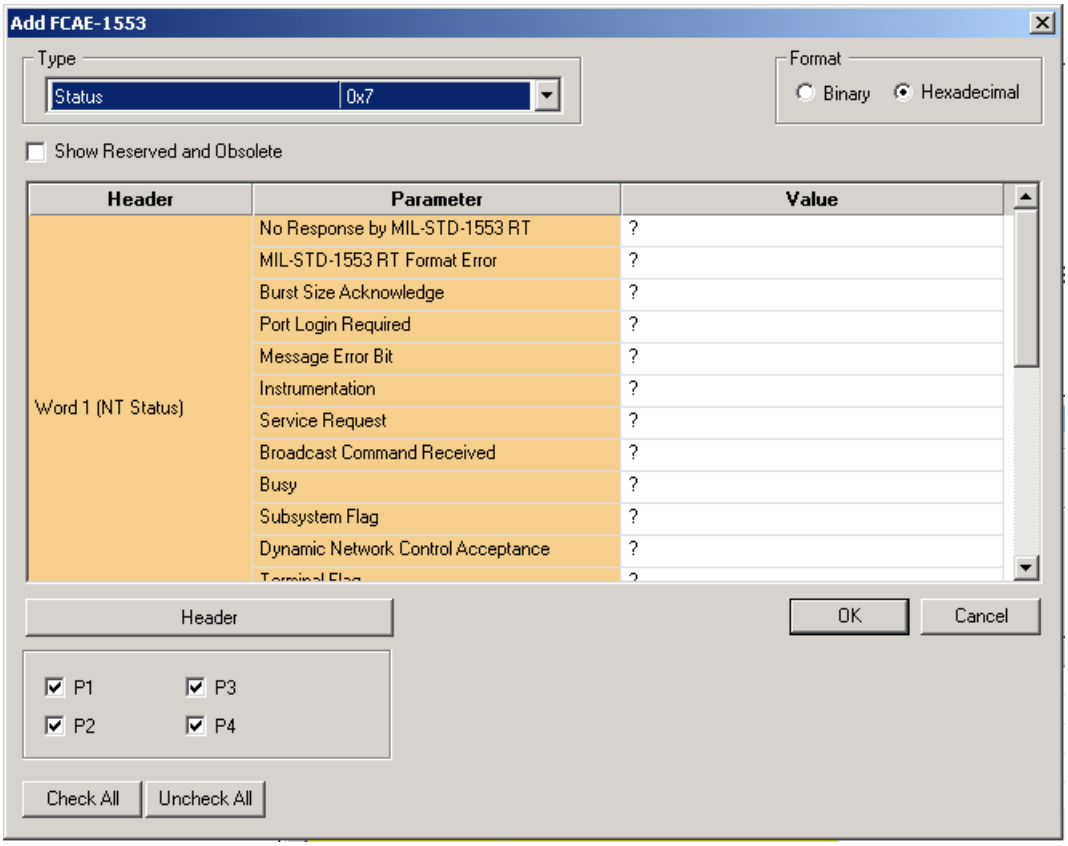


Figure 2.50: FCAE-1553 (Status) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status

FCAE-FCP SCSI Command - RDMA With Target Notification

Double-click **FCAE RDMA FCP SCSI Command-With Target Notification** in the Patterns Library panel to open thee Add FCAE RDMA FCP SCSI Command-With Target Notification dialog.

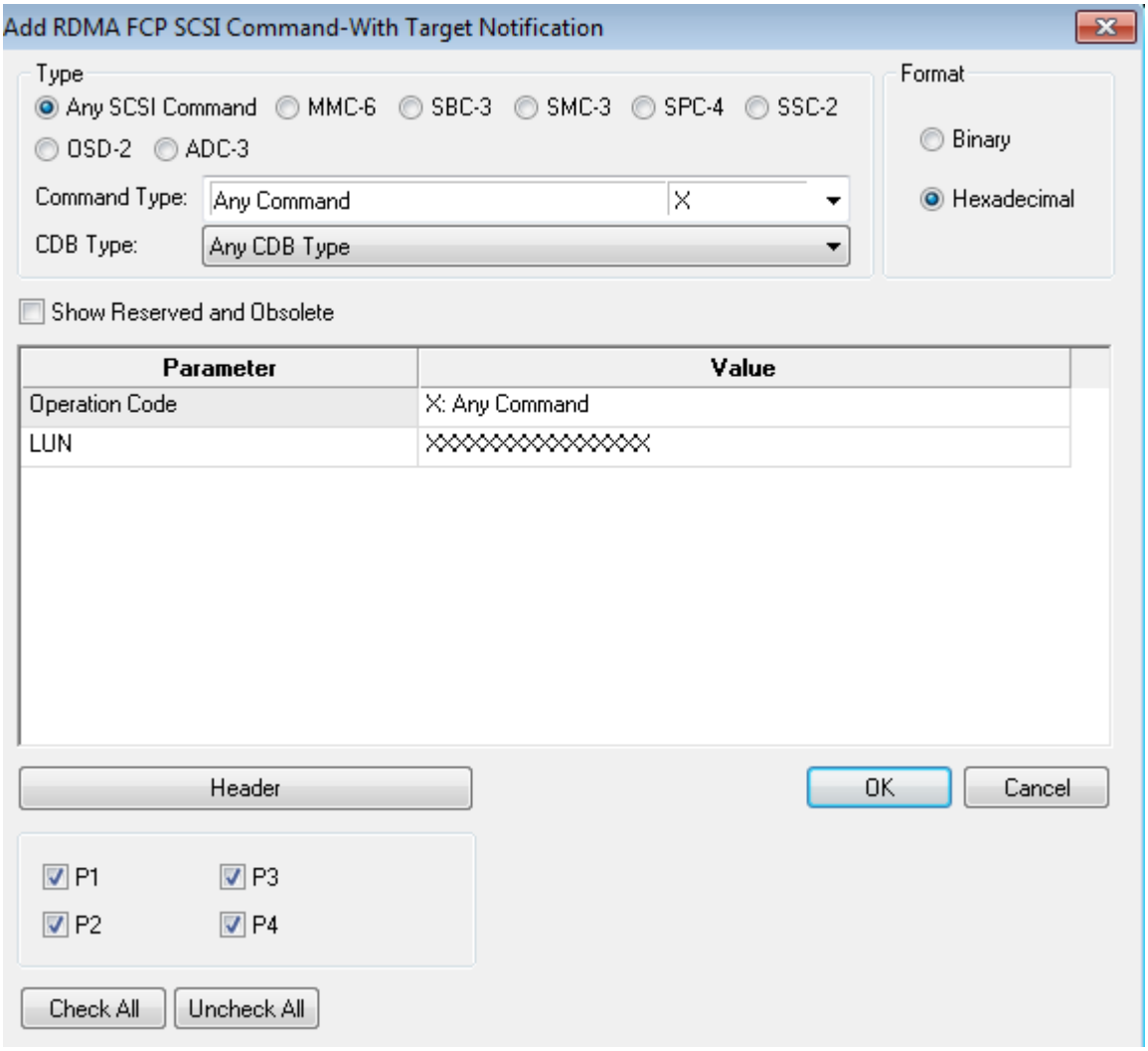


Figure 2.51: FCAE FCP-RDMA SCSI Command With Target Notification Dialog

The format can be **Binary** or **Hexadecimal**.

If you select **Any SCSI Command**, the Command Type can only be **Any Command**. Click the down arrow next to the CDB dropdown list, scroll the list to choose a CDB Type, and click **OK**. The **Any** option allows specifying any vendor-specific or other command.

If you select **MMC-6, SBC-3, SMC-3, SPC-4, SSC-2, OSD-2**, or **ADC**-3, click the down arrow next to the Command Type dropdown list, scroll the list to choose a Command Type, and click **OK**.

FCAE RDMA FCP Command Frame Information Unit With Target Notification

Double-click **FCAE RDMA FCP Command Frame Information Unit -With Target Notification** in the Pattern window to open the Add FCAE RDMA FCP Command Frame Information Unit With Target Notification dialog.

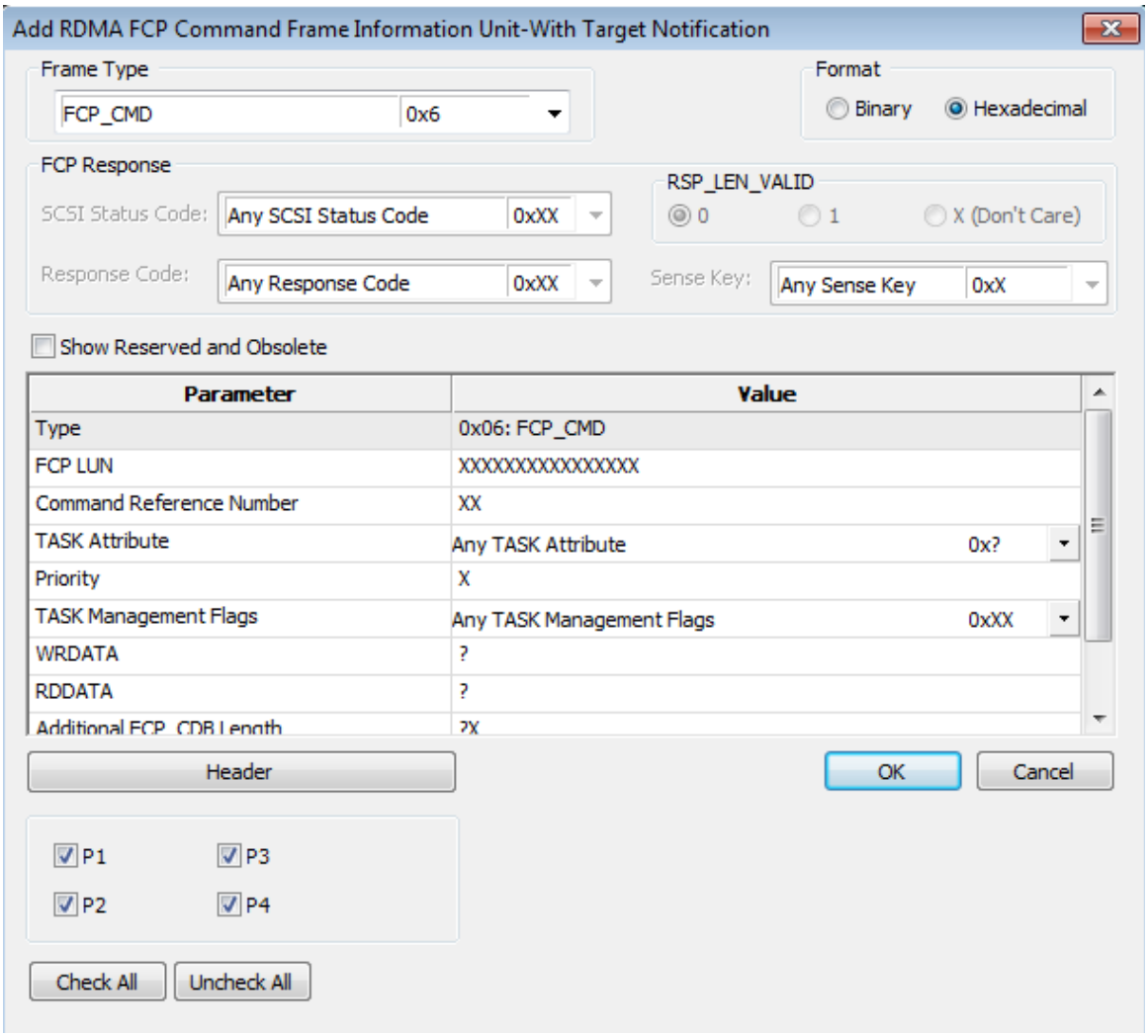


Figure 2.52: FCAE RDMA FCP Command Frame Information Unit -With Target Notification Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Frame Type**, click the dropdown list. On selecting a Frame Type the Parameters and Value of that Frame Type are displayed.

FCAE-RDMA FCP SCSI Command Without Target Notification

Double-click **FCAE RDMA FCP SCSI Command-Without Target Notification** in the Patterns Library panel to open the Add FCAE RDMA FCP SCSI Command-Without Target Notification dialog.

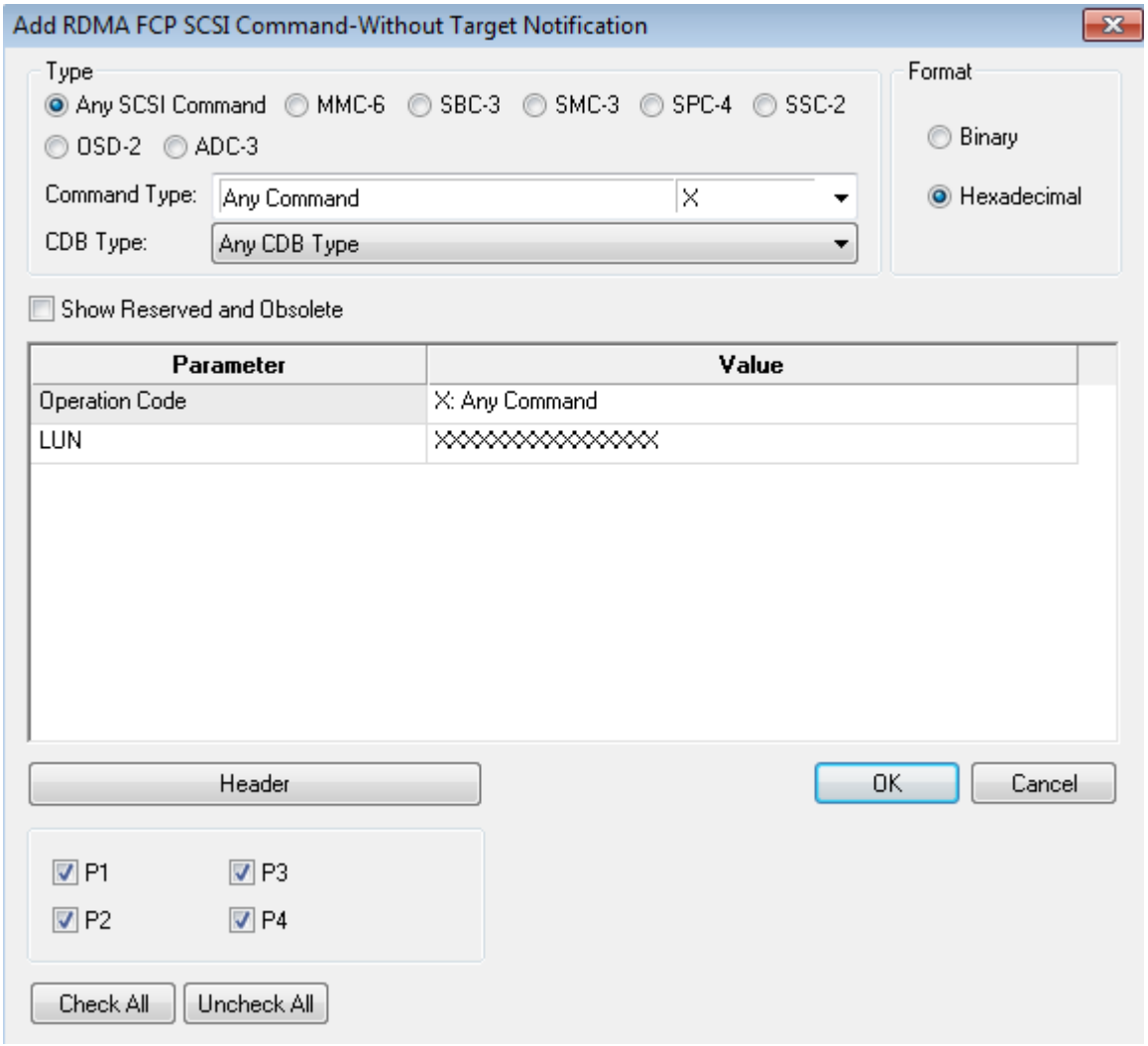


Figure 2.53: FCAE RDMA FCP SCSI Command Without Target Notification Dialog

The format can be **Binary** or **Hexadecimal**.

If you select **Any SCSI Command**, the Command Type can only be **Any Command**. Click the down arrow next to the CDB dropdown list, scroll the list to choose a CDB Type, and click **OK**. The **Any** option allows specifying any vendor-specific or other command.

If you select **MMC-6, SBC-3, SMC-3, SPC-4, SSC-2, OSD-2**, or **ADC-**3, click the down arrow next to the Command Type dropdown list, scroll the list to choose a Command Type, and click **OK**.

FCAE RDMA FCP Frame Information Unit Without Target Notification

Double-click **FCAE RDMA FCP Frame Information Unit -With Target Notification** in the Pattern window to open the Add FCAE RDMA FCP Frame Information Unit -With Target Notification dialog.

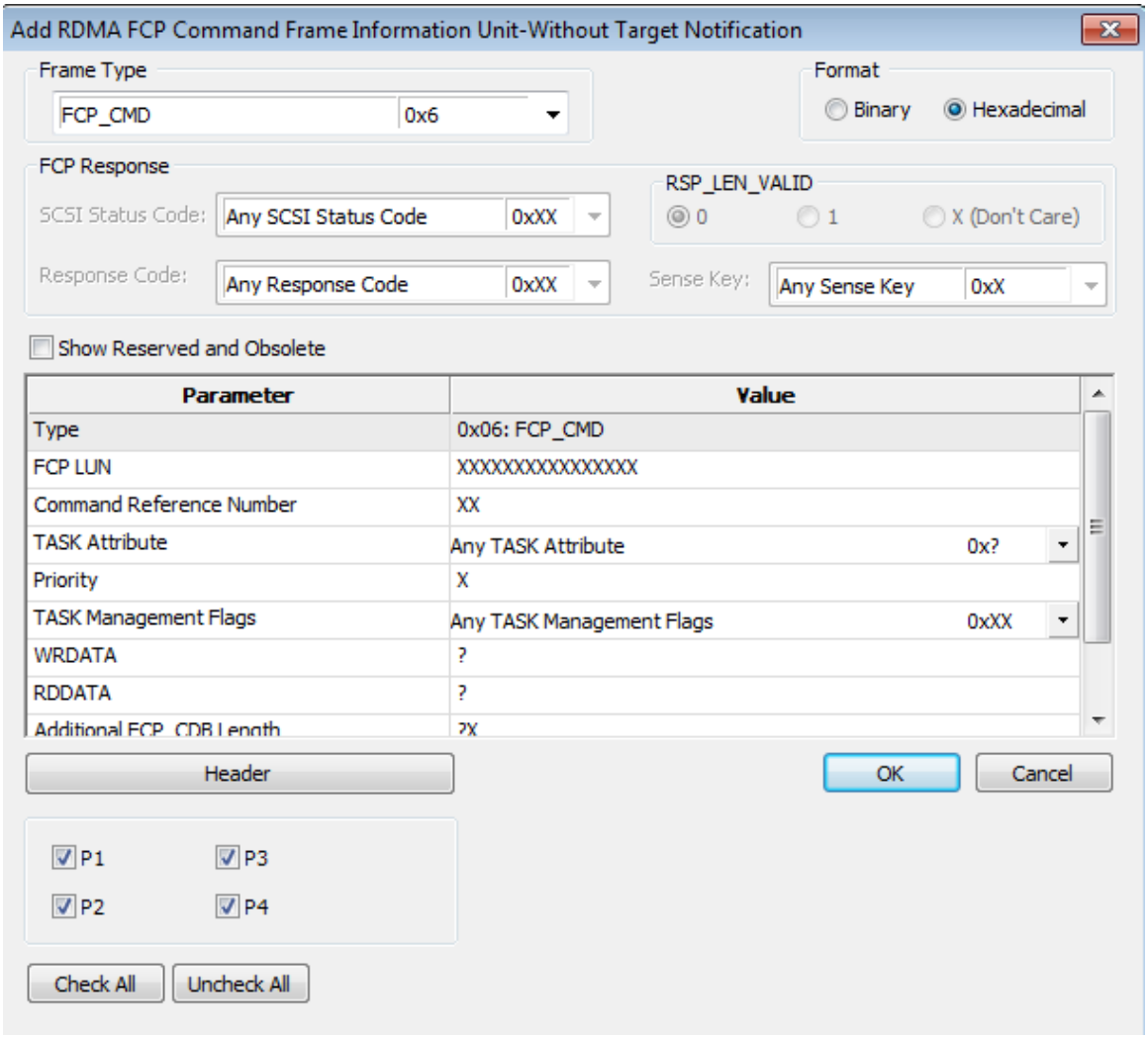


Figure 2.54: FCAE RDMA FCP Frame Information Unit Without Target Notification Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Frame Type**, click the dropdown list. On selecting a Frame Type the Parameters and Value of that Frame Type are displayed.

FCVI

The following patterns are available for FCVI:

FCVI(Any)

FCVI(SEND_RQST)

FCVI(WRITE_RQST)

FCVI(READ_RQST)

FCVI(SEND_RESP)

FCVI(WRITE_RESP)

FCVI(READ_RESP)

FCVI(CONNECT_RQST)

FCVI(DISCONNECT_RQST)

FCVI(CONNECT_RESP1)

FCVI(CONNECT_RESP2)

FCVI(CONNECT_RESP3)

FCVI(DISCONNECT_RESP)

Double-click on any of the FCVI patterns listed above in the Patterns Library panel to open the FCVI dialog. Select a FCVI service from the dropdown list which has the options listed above. The format can be **Binary** or **Hexadecimal**.

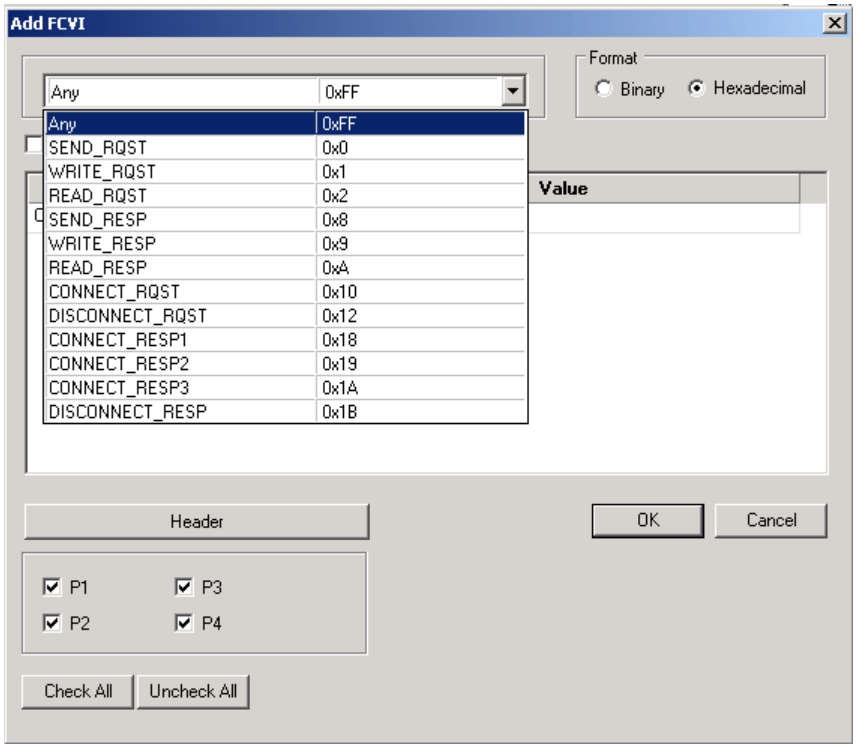


Figure 2.55: FCVI Service Dialog

FCAV

Two FCAV Patterns patterns are available:

FCAV(Simple)

FCAV(Extended)

Double-click on either of the FCAV patterns listed above in the Patterns Library panel to open the FCAV dialog. Select an FCAV service from the dropdown list which has the two options listed above. Format can be **Binary** or **Hexadecimal**.

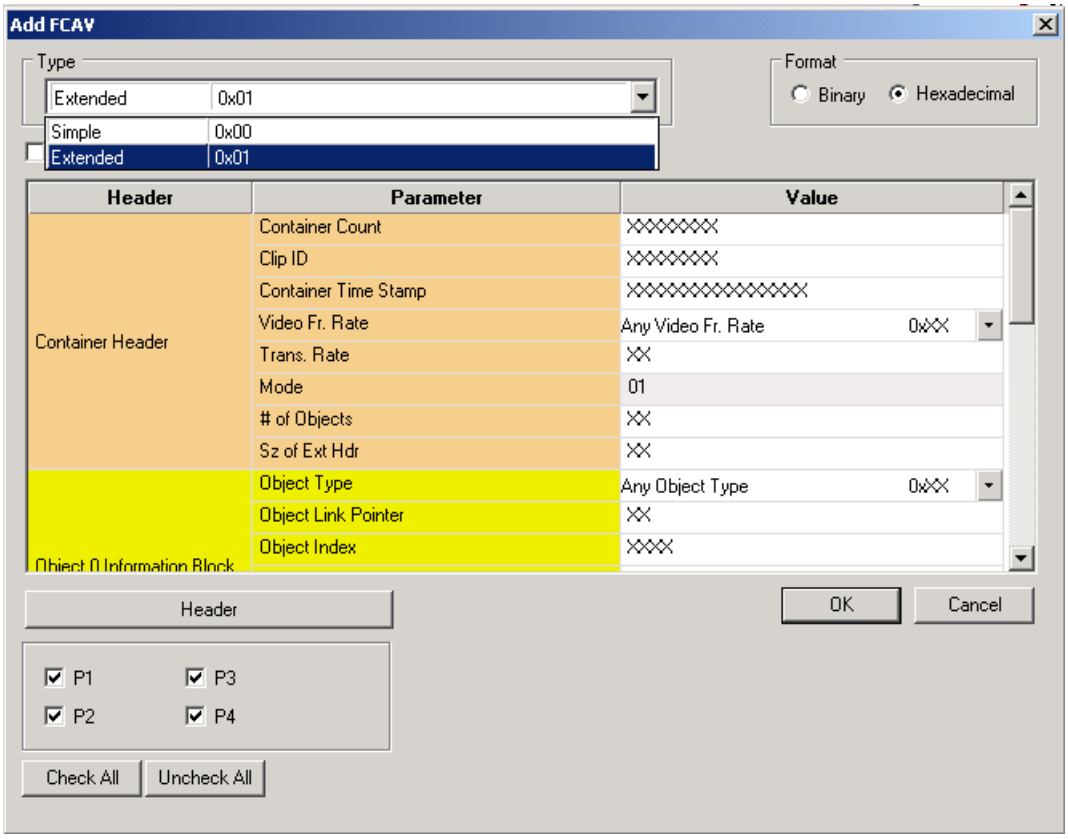


Figure 2.56: FCAV Service Dialog

To select the value for Add FCAV, Simple or Extended Container Header, click on the drop-down menu and select from the options listed below

- Any Video Fr. Rate
- Null
- 15
- 20
- 24
- 24*1000/1001
- 24 (Segmented frames)
- 24*1000/1001 (Segmented frames)
- 25 (PAL)
- 30
- 30*1000/1001 (29.97 NTSC)
- 50
- 60
- 60*1000/1001 (59.94 NTSC)

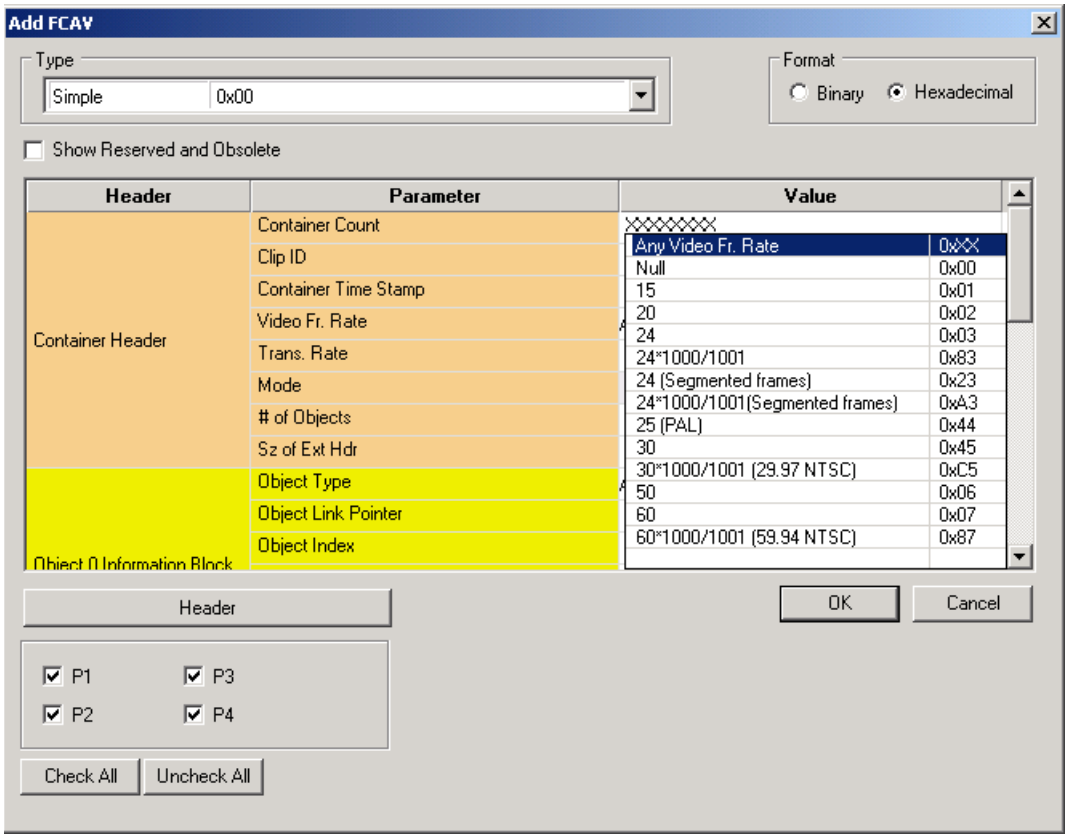


Figure 2.57: FCAV Container Header Values Dialog

To select the value for Add FCAV, Simple or Extended Object Information Block, click on the drop-down menu and select from the options listed below

- Any Object Type
- Video - uncompressed
- Video - compressed
- Video - reserved
- Video Program
- Video Program - reserved
- Graphics
- Graphics - reserved
- Audio - uncompressed
- Audio - compresses
- Audio - reserved
- Ancillary Data
- Full Stream - structures
- Full Stream - reserved
- Negotiated
- Vendor Specific

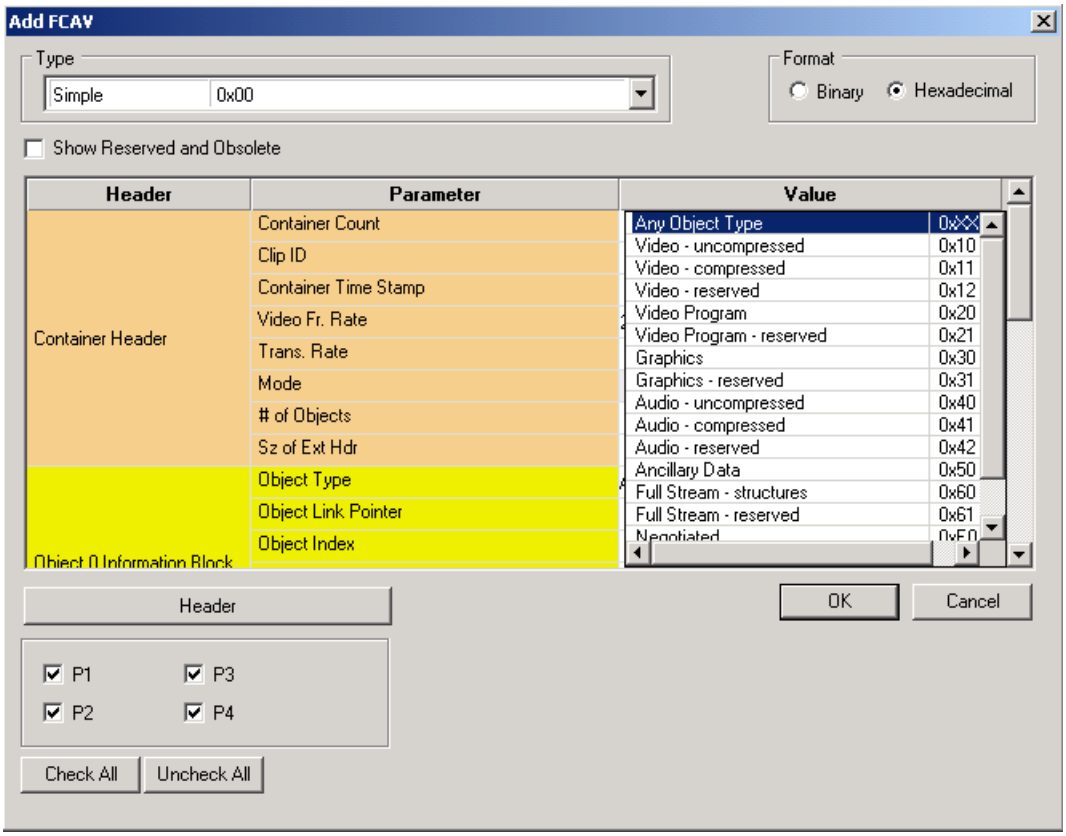


Figure 2.58: FCAV Object Information Values Dialog

ADVB

ADVB(Object0)

Double-click on ADVB(Object0) in the Patterns Library panel to open the Add ADVB(Object0) dialog. Format can be **Binary** or **Hexadecimal**.

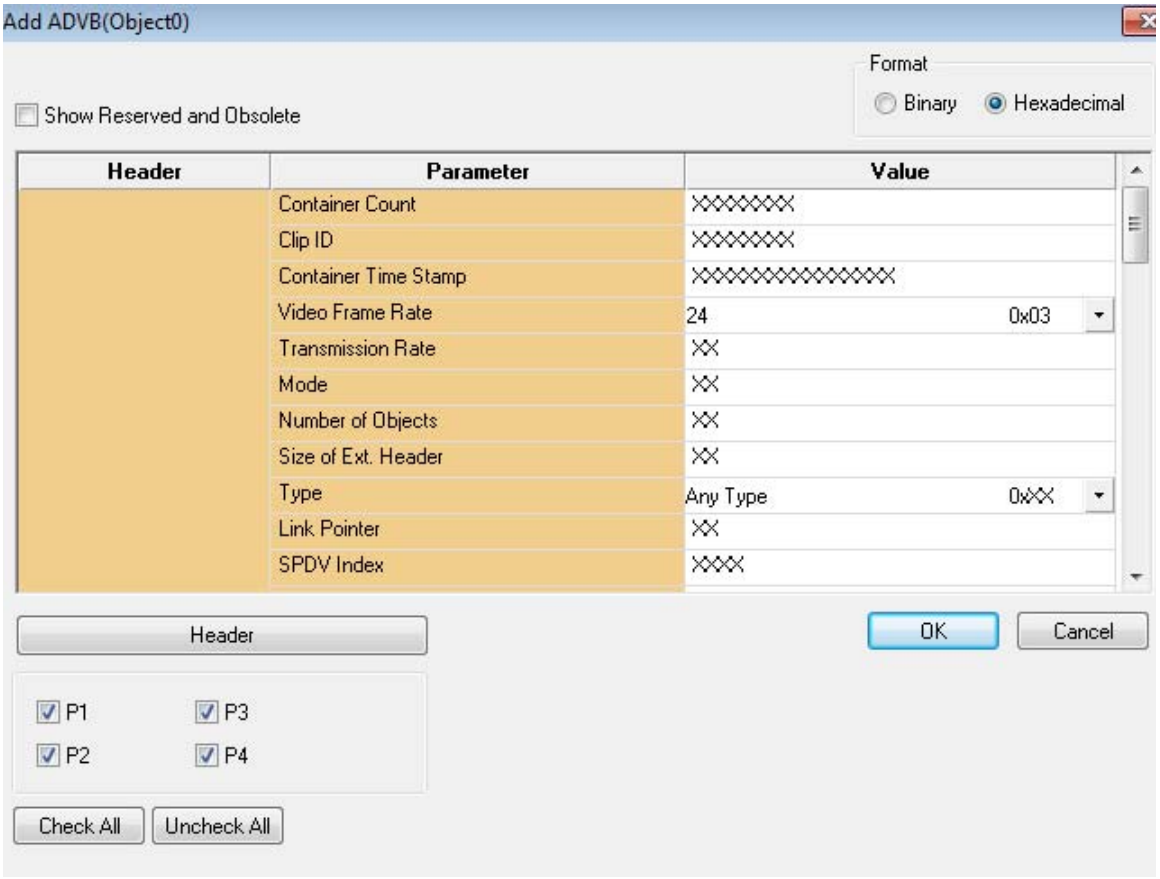


Figure 2.59: Add ADVB(Object0) Dialog

To select the value for ADVB (Object0) Video Frame Rate, click on the drop-down menu and select from the options listed below (see Figure 2.60 on page 95).

- Any Video Frame Rate
- Null (aperiodic)
- 15
- 20
- 24
- 24*1000/1001
- 24 (Segmented frames)
- 24*1000/1001 (Segmented frames)
- 25 (PAL)
- 30
- 30*1000/1001 (29.97 NTSC)
- 50
- 60

- 60*1000/1001 (59.94 NTSC)
- 50 (VESA DMT)
- 60 (VESA DMT)
- 75 (VESA DMT)
- 85 (VESA DMT)
- 50 (VESA CVT)
- 60 (VESA CVT)
- 75 (VESA CVT)
- 85 (VESA CVT)

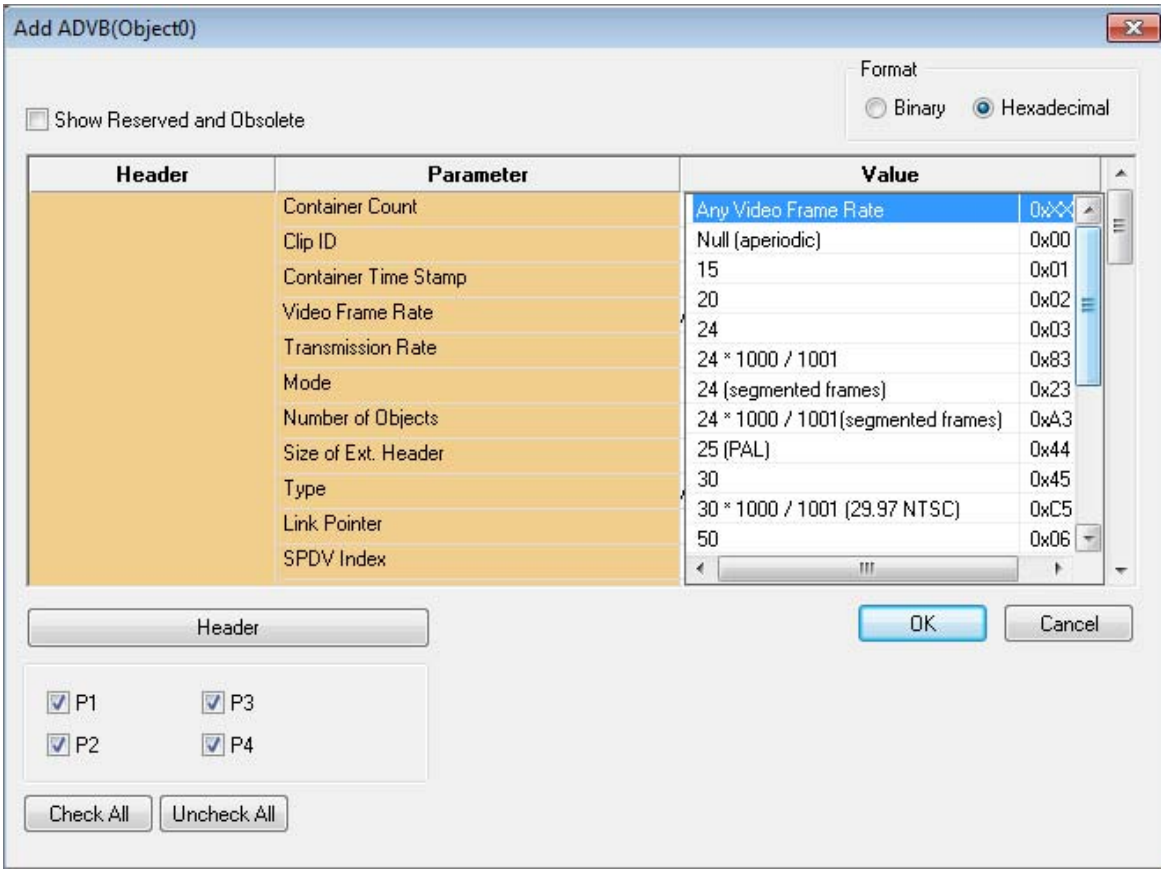


Figure 2.60: Add ADVB9Object0) Video Frame Rate Drop-down List

To select the value for ADVB (Object0), (Object1), (Object2) Type, click on the drop-down menu and select from the options listed below.

- Any Type
- Video Data
- Video Data
- Audio Data
- Ancillary Data

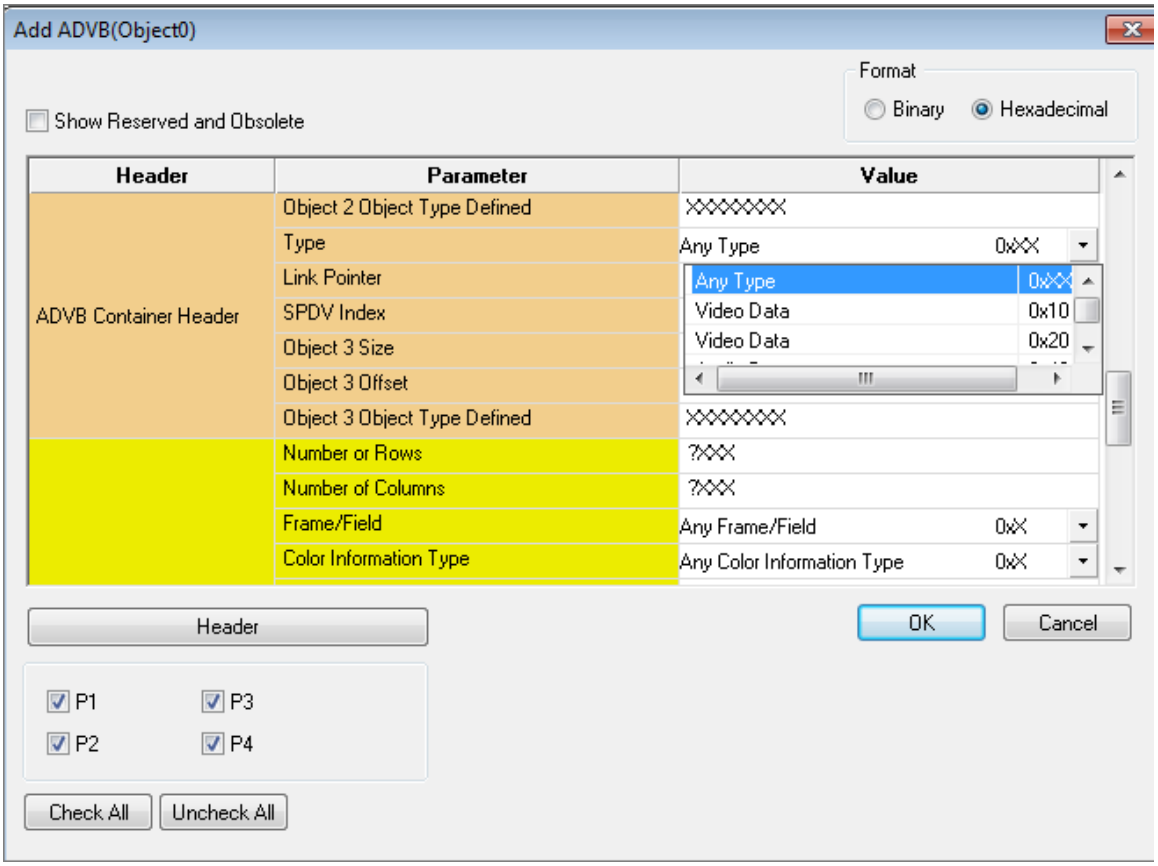


Figure 2.61: Add ADVB (Object0), (Object1), (Object2) Type Drop-down List

To select the value for ADVB (Object0) Frame/Field, click on the drop-down menu and select from the options listed below.

- Any Frame/Field
- Full Video Frame
- Pixel Interleaved, odd pixels
- Pixel Interleaved, even pixels
- Field based, Pixel Interleaved, odd pixels
- Field based, Pixel Interleaved, even pixels
- Spare
- Field based, contains both fields within this container
- Field based, Field 1 only
- Field based, Field 2 only
- Spare

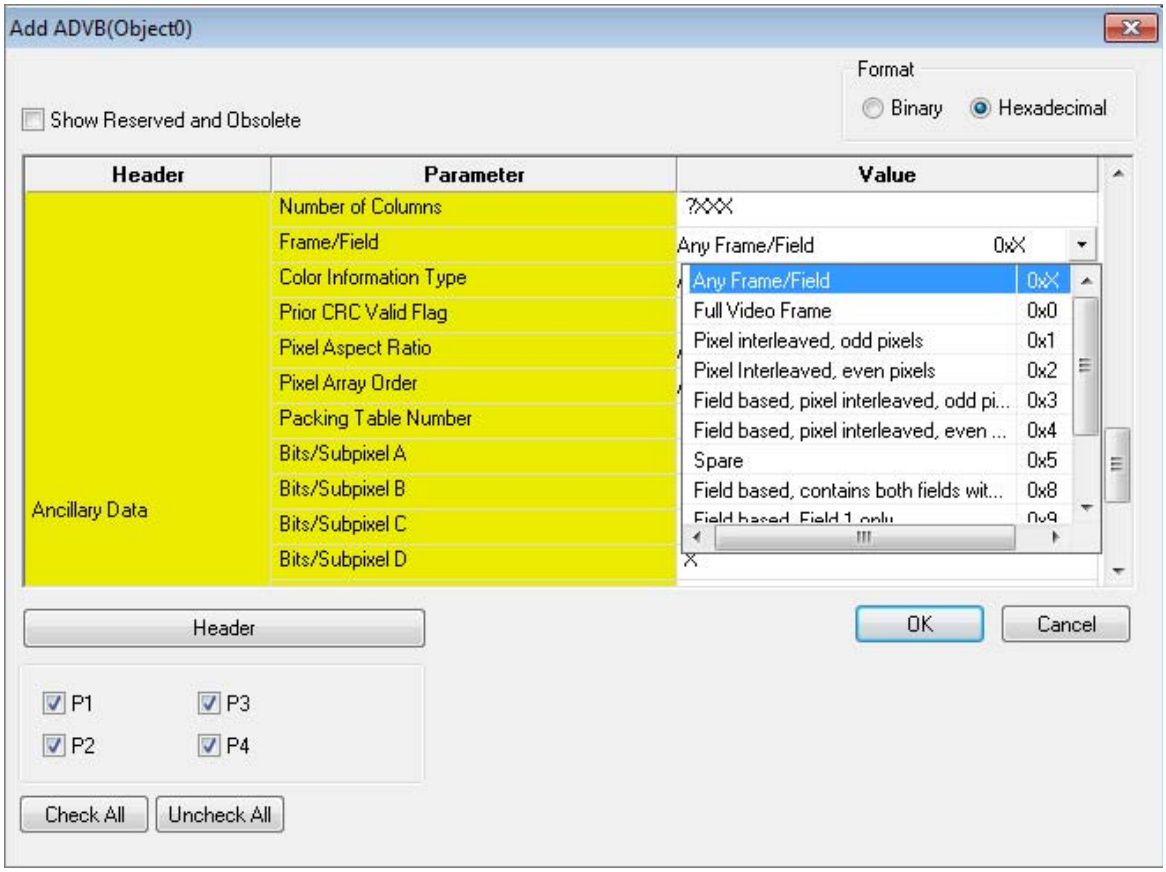


Figure 2.62: Add ADVB(Object0) Frame/Field Drop-down List

To select the value for ADVB (Object0) Color Information Type, click on the drop-down menu and select from the options listed below.

- Any Color Information Type
- Monochrome
- RGB
- RGGB
- RGBA
- YIQ
- YCbCr
- Spare
- Color Palette, Auxiliary Object table
- Color Palette, External table
- Color Palette, Internal table
- Packed RGB
- Packed RGGB
- Packed RGBA
- Packed YIQ
- Packed YCbCr

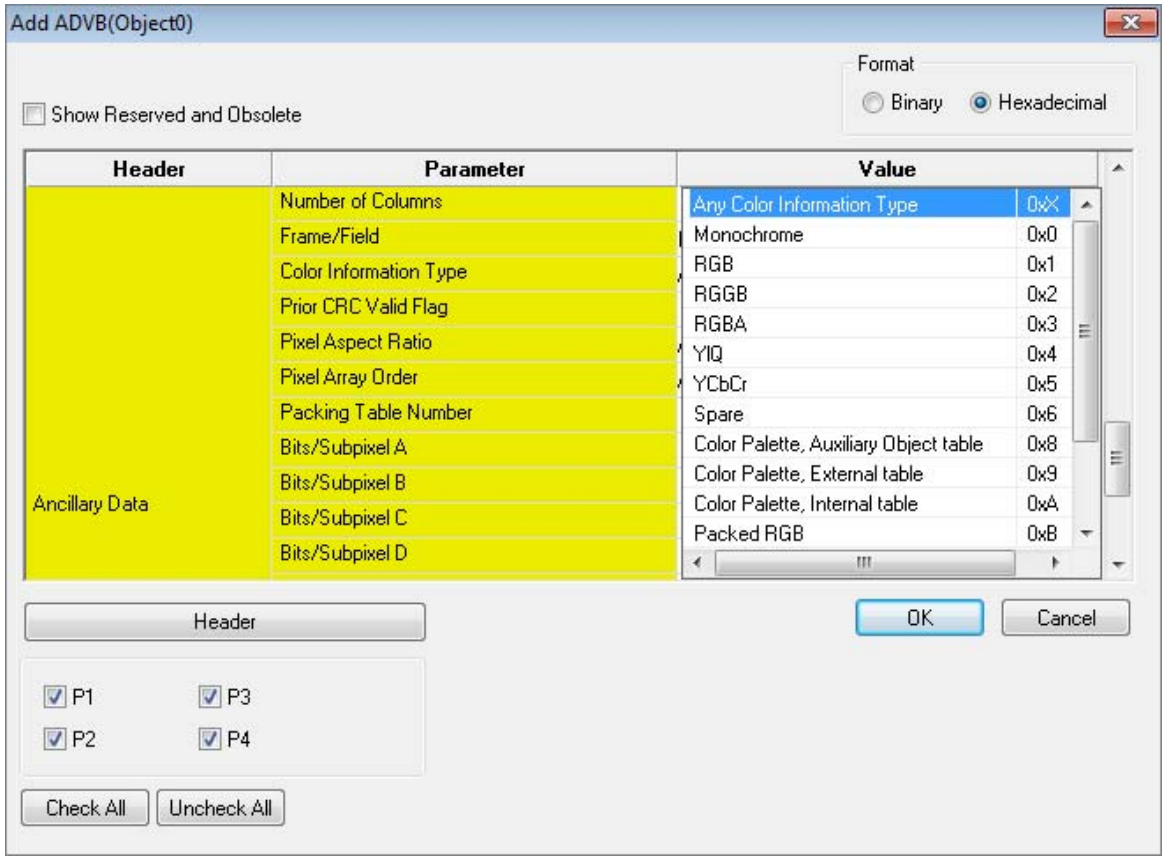


Figure 2.63: Add ADVB(Object0) Color Information Type Drop-down List

To select the value for ADVB (Object0) Pixel Aspect Ratio, click on the drop-down menu and select from the options listed below.

- Any Pixel Aspect Ratio
- 1:1
- 1:1.2
- 1:2.1
- NTSC (approx. 8.9
- PAL (16:15)
- Spare

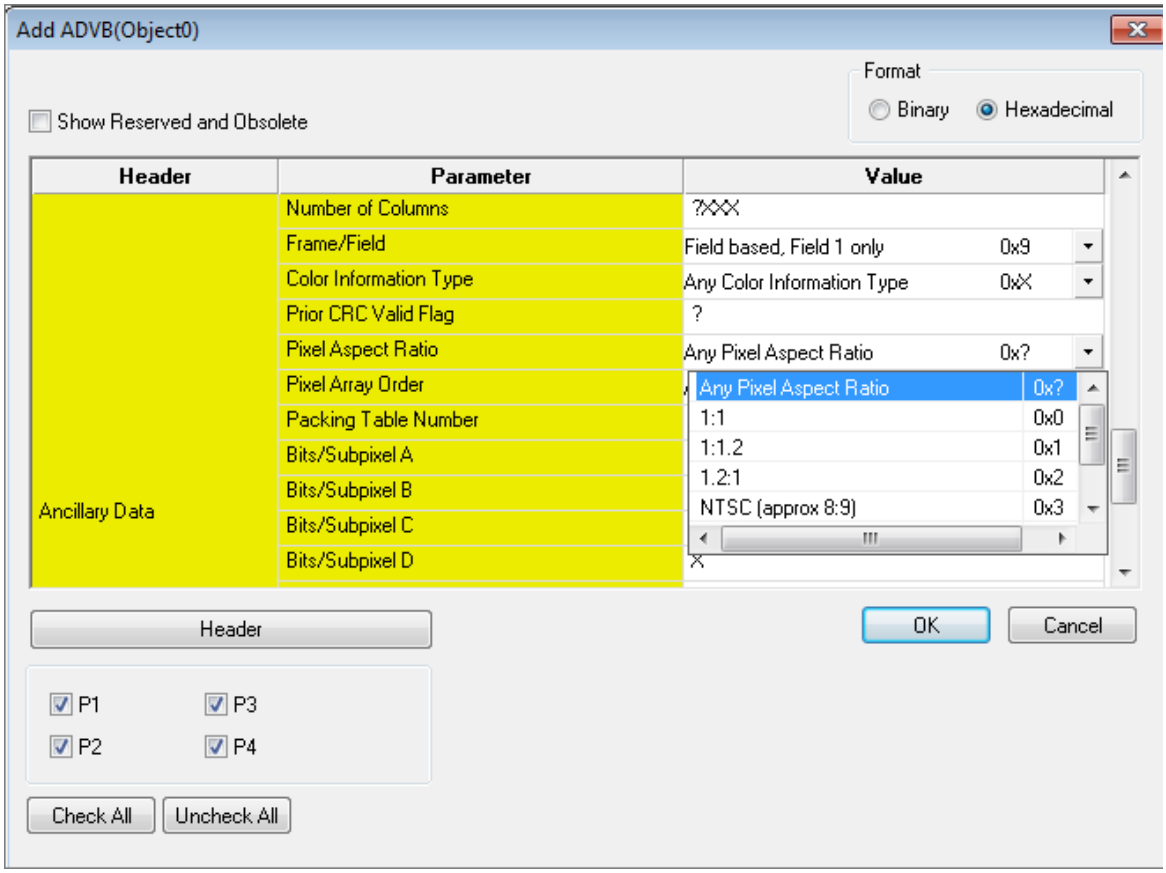


Figure 2.64: Add ADVB(Object0) Pixel Aspect Ratio Drop-down List

To select the value for ADVB (Object0) Pixel Array Order, click on the drop-down menu and select from the options listed below.

- Any Pixel Array Order
- Left to Right, Top to Bottom
- Right to Left, Top to Bottom
- Left to Right, Bottom to Top
- Right to Left, Bottom to Top
- Top to Bottom, Left to Right
- Top to Bottom, Right to Left
- Bottom to Top, Left to Right
- Bottom to Top, Right to Left
- Spare

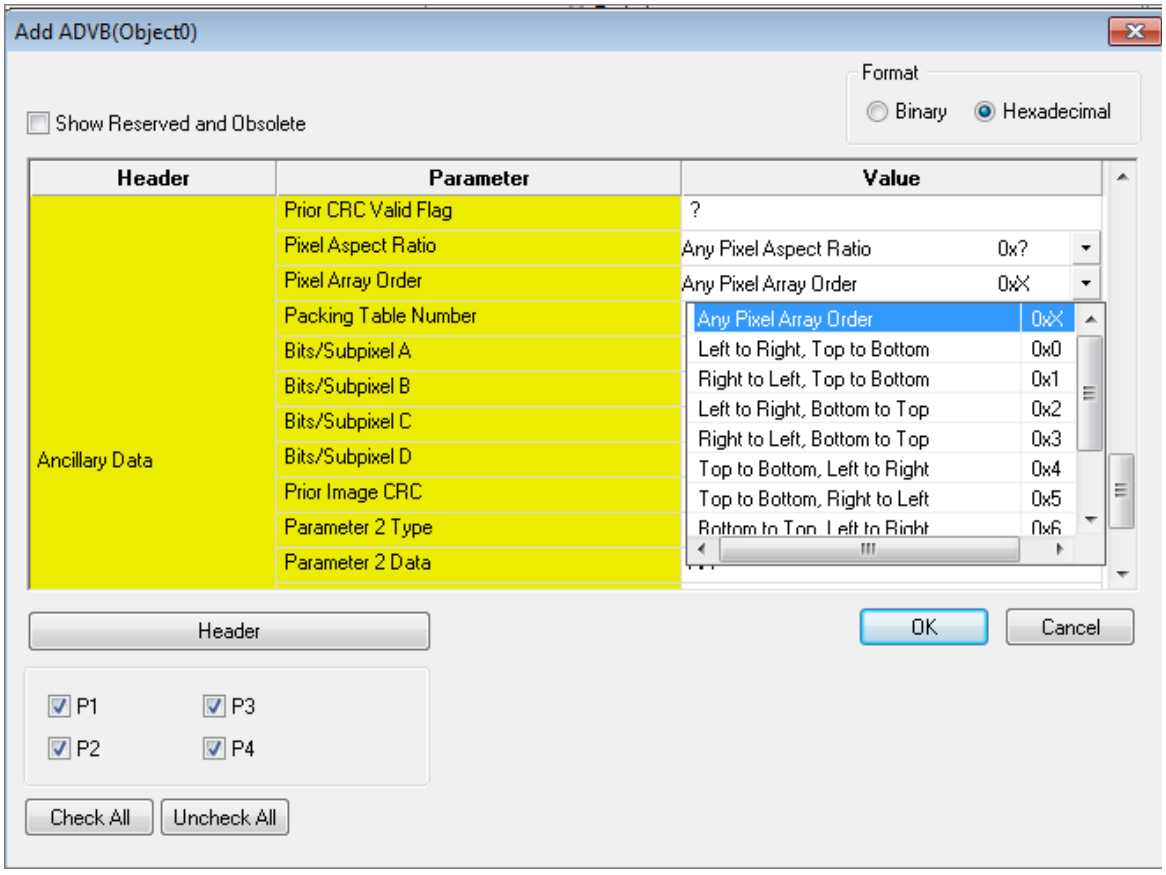


Figure 2.65: Add ADVB(Object0) Pixel Array Order Drop-down List

ADVB(Object2/3)

Double-click on ADVB(Object2/3) in the Patterns Library panel to open the Add ADVB(Object2/3) dialog. Format can be **Binary** or **Hexadecimal**.

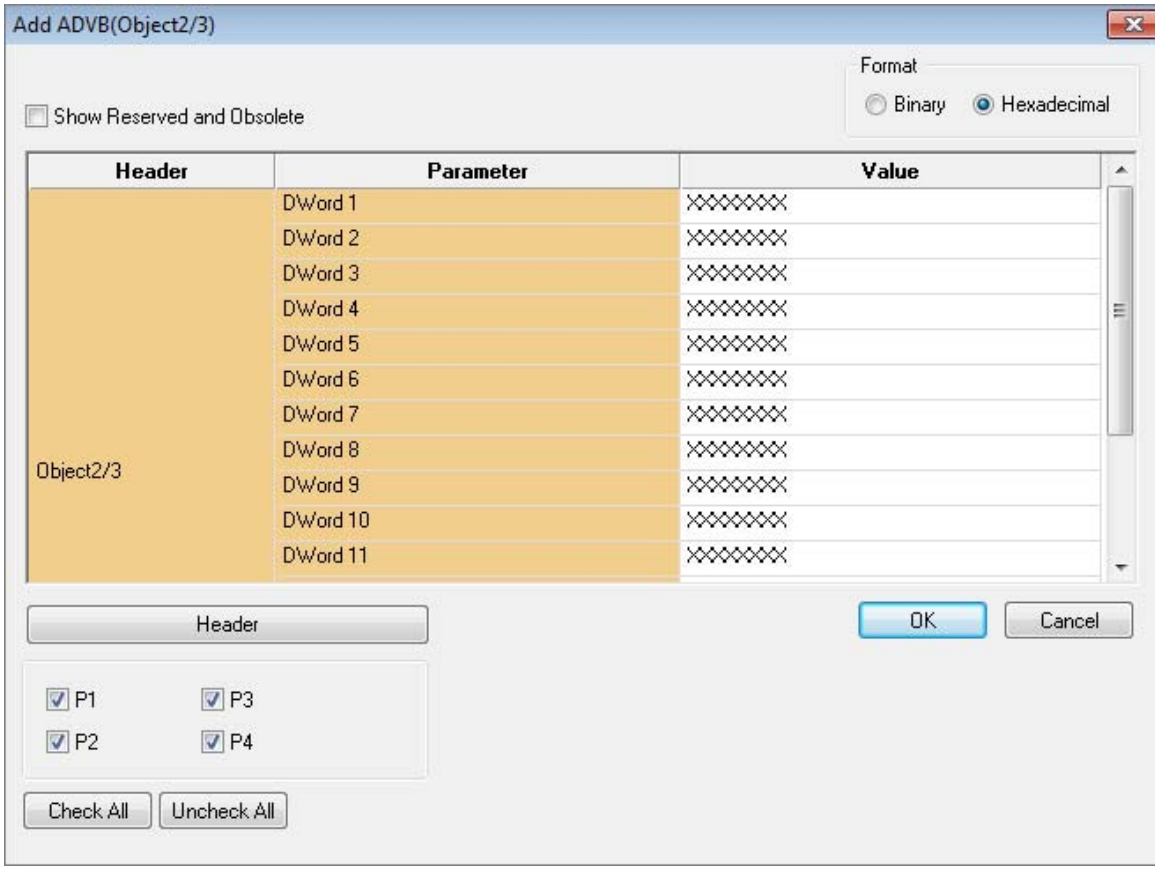


Figure 2.66: Add ADVB(Object2/3) Dialog

VSAN Basic

VSAN-Basic Link Service

Double-click **VSAN-Basic Link Service** in the Patterns Library panel to open the VSAN-Basic Link Service dialog to add any Type of VSAN-Basic Link Service.

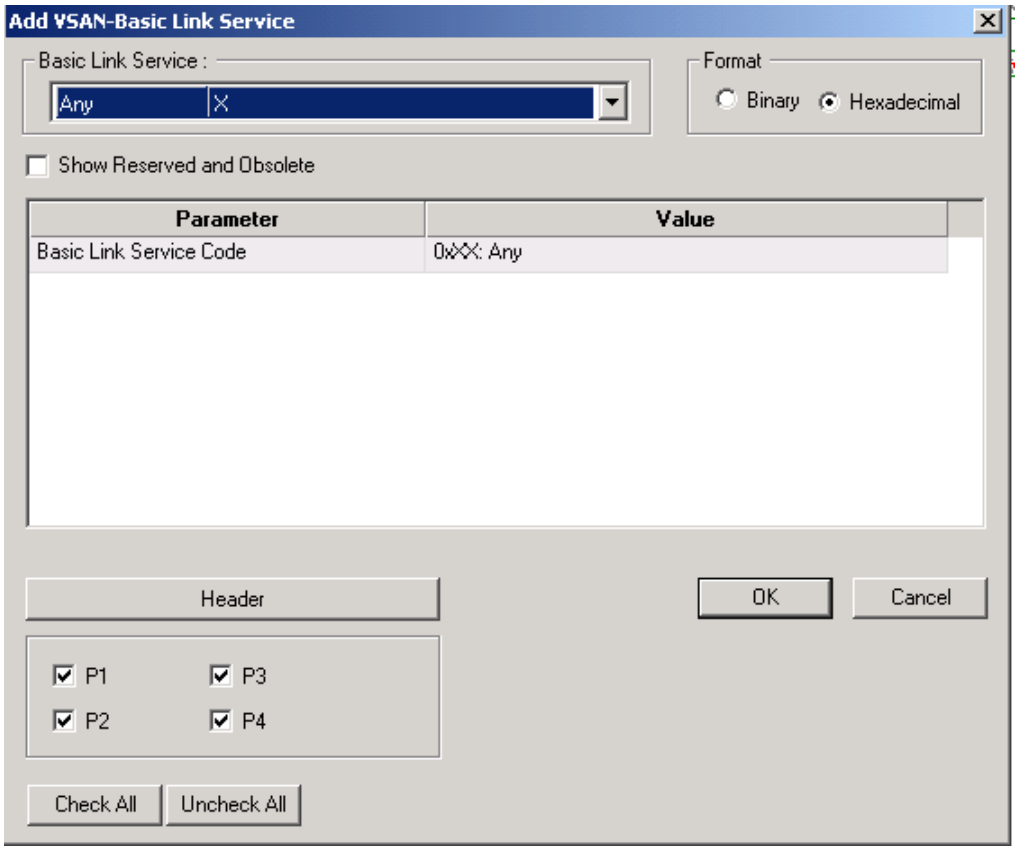


Figure 2.67: VSAN-Basic Link Service Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **VSAN-Basic Link Service** click the dropdown list which has the following options:

- Any
- NOP
- ABTS
- BA_ACC
- BA_RJT

VSAN-Link Control Frame

Double-click **VSAN-Link Control Frame** in the Patterns Library panel to open the VSAN-Link Control Frame dialog to add any Type of VSAN-Link Control Frame.

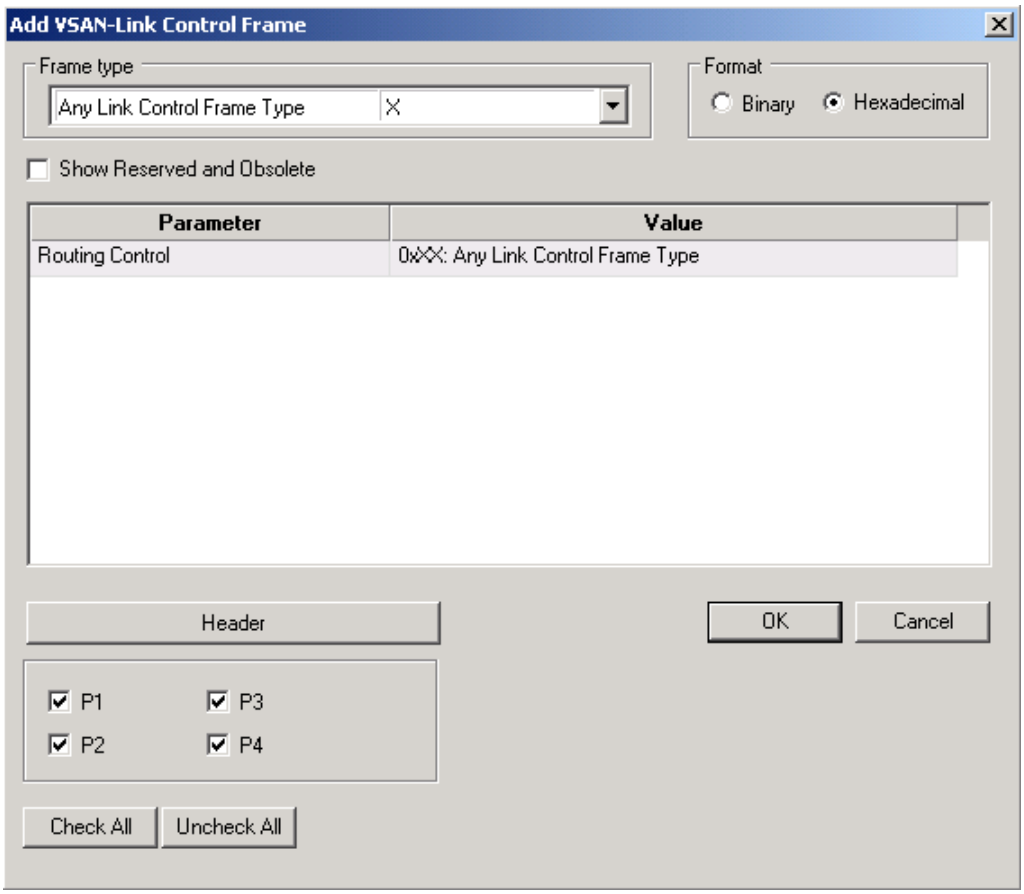


Figure 2.68: VSAN-Link Control Frame Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Frame type** click the dropdown list which has the following options:

- Any Link Control Frame Type
- ACK_1
- ACK_0
- P_RJT
- F_RJT
- P_BSY
- F_BSY_DATA_FRM
- F_BSY_LINK_CTRL
- LCR
- NTY
- END

VSAN FCP

Add VSAN-FCP SCSI Command

Double-click **VSAN FCP SCSI Command** in the Patterns Library panel to open the VSAN FCP SCSI Command dialog.

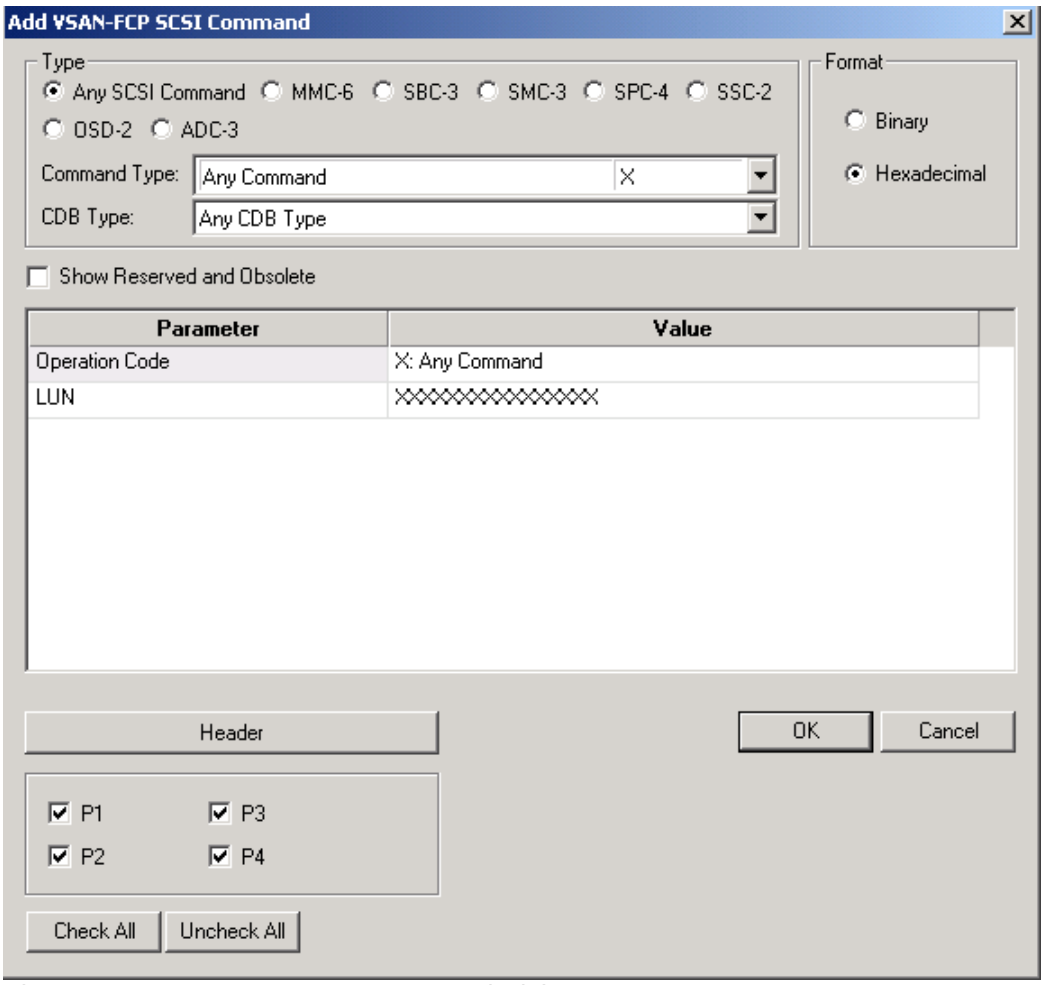


Figure 2.69: VSAN FCP SCSI Command Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **VSAN FCP SCSI Command Type** select from the following options:

- Any SCSI Command
- MMC_6
- SBC_3
- SMC_3
- SPC_4
- SSC_2
- OSD_2
- ADC_3

Add VSAN-FCP Frame Information Unit

Double-click **VSAN-FCP Frame Information Unit** in the Patterns Library panel to open the VSAN-FCP Frame Information Unit dialog.

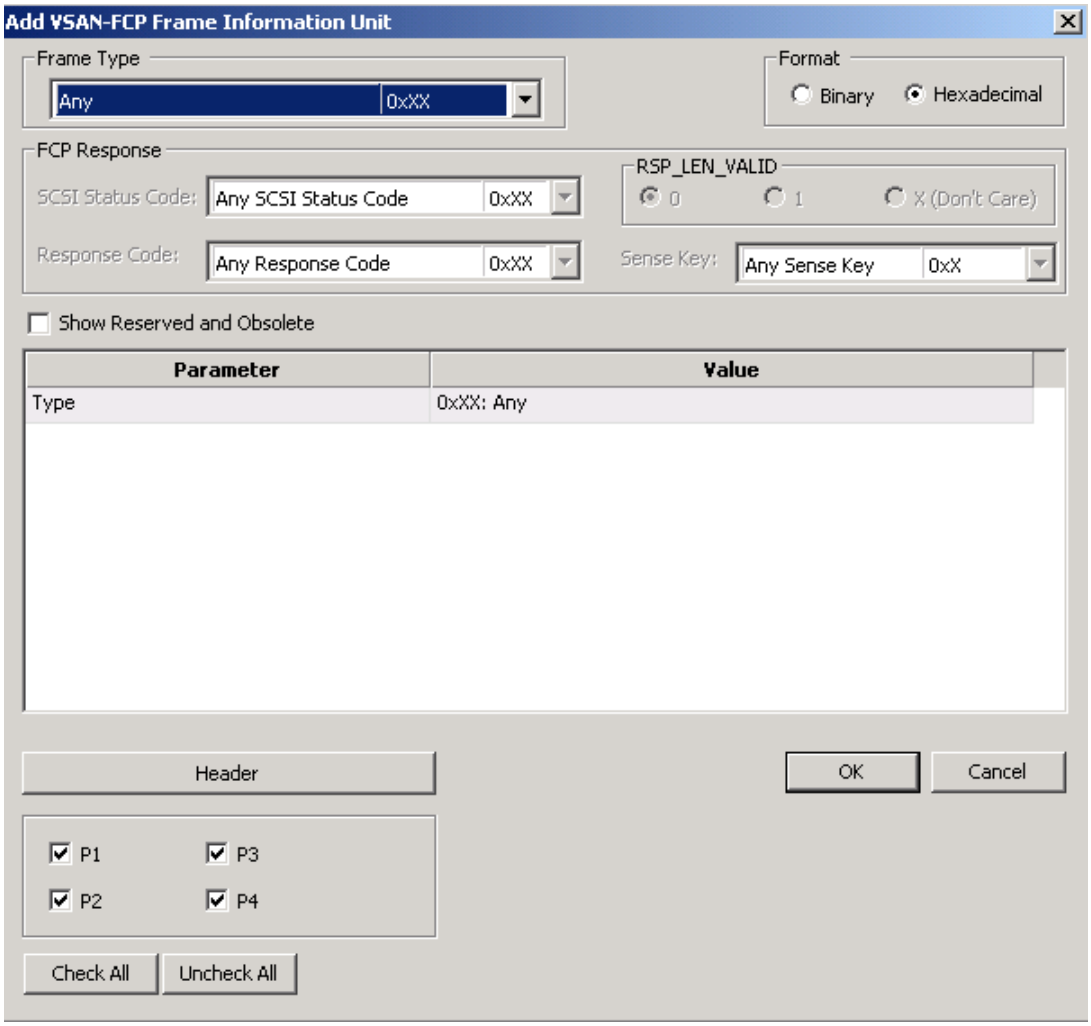


Figure 2.70: VSAN-Frame Information Unit Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **VSAN-Frame Information Unit Type** click the dropdown list which has the following options:

- Any
- FCP_DATA
- FCP_CONFIRM
- FCP_XFER_RDY
- FCP_CMD
- FCP_RSP

Add VSAN-SCSI Command Status

Double-click **VSAN-SCSI Command Status** in the Patterns Library panel to open the VSAN-SCSI Command Status dialog.

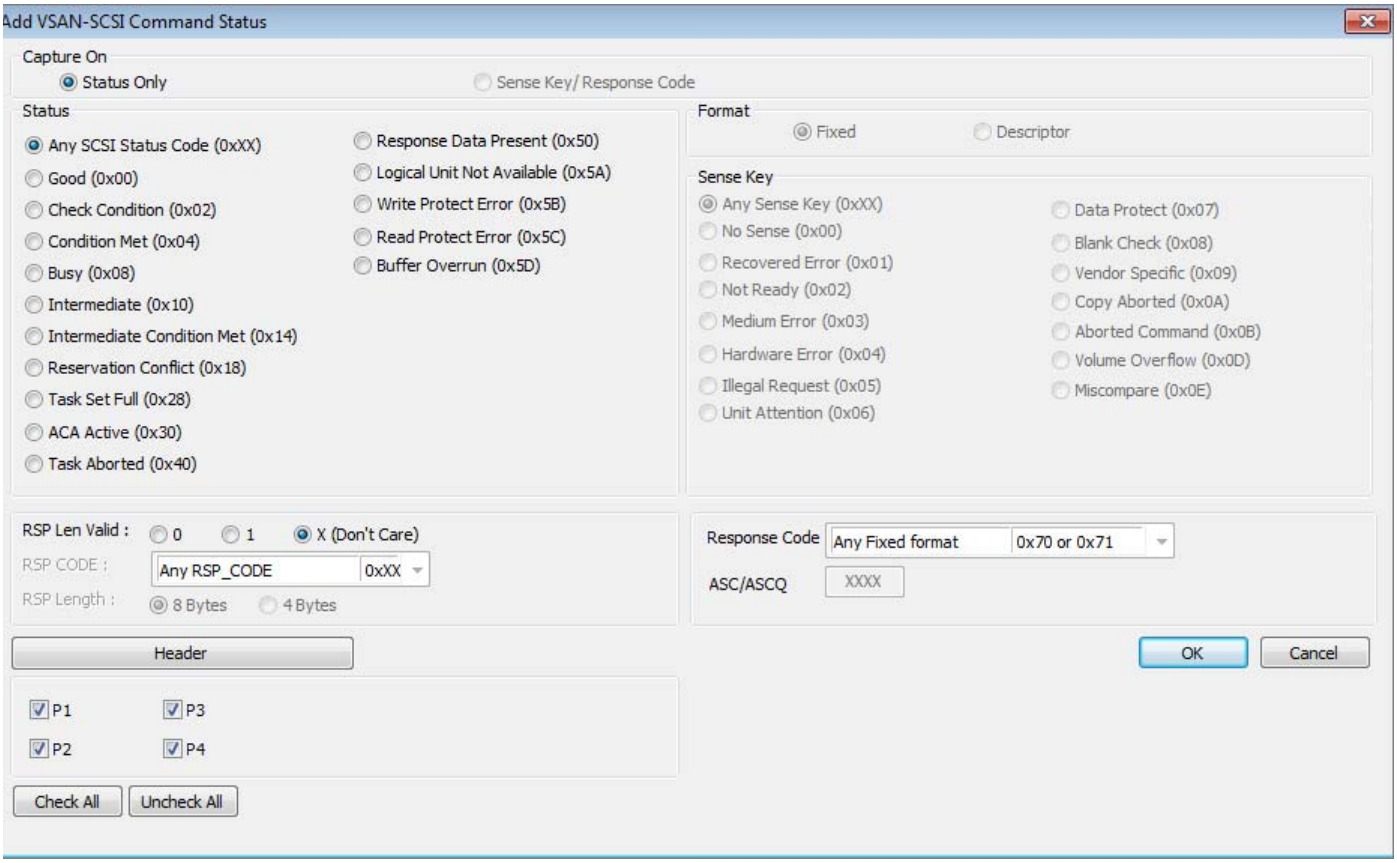


Figure 2.71: VSAN-SCSI Command Status Dialog

You can capture on **Status Only** or **Sense Key/Response Code**. Click on **Status Only** to display all the states that are available. Click on the **Sense Key/Response Code** to display all the Format and Sense Keys.

RSP_CODE: It is selected by default. You can click on the dropdown list to select more options.

Add VSAN FCP Task Management

Double-click **VSAN FCP Task Management** in the Patterns Library panel to open the VSAN FCP Task Management dialog.

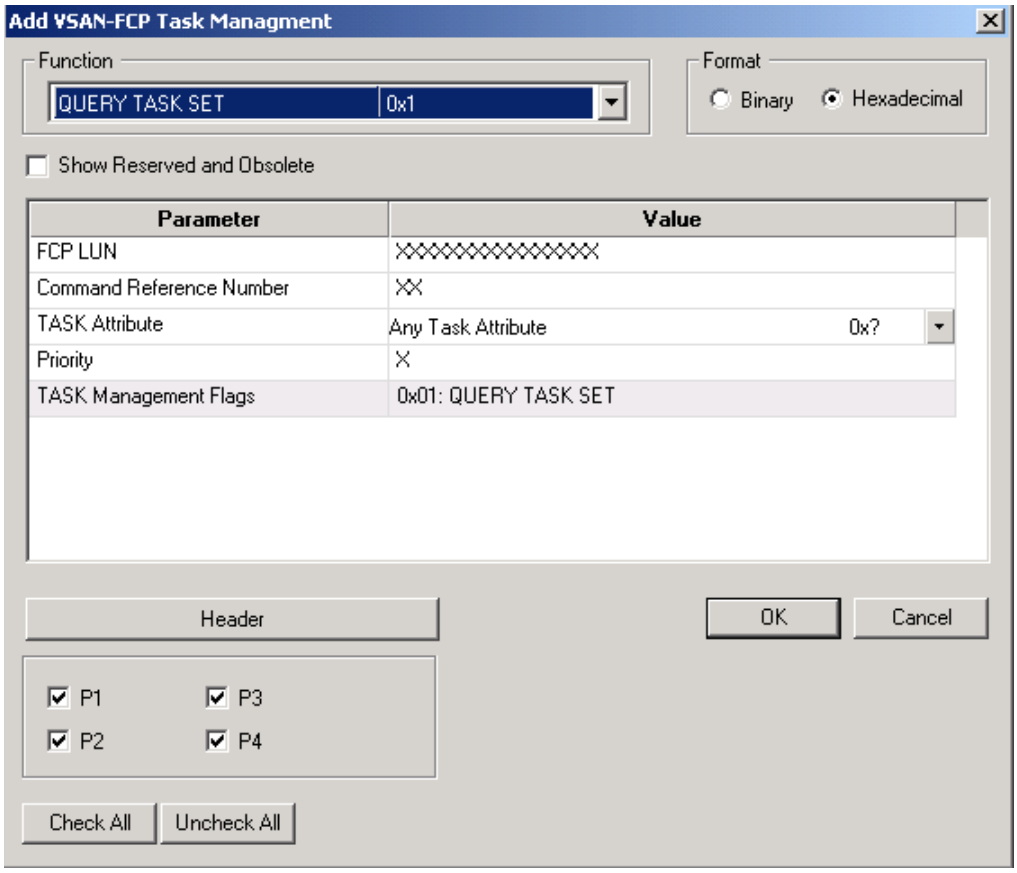


Figure 2.72: VSAN FCP Task Management Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Function** click the dropdown list which has the following options:

- QUERY TASK SET
- ABORT TASK SET
- CLEAR TASK SET
- QUERY UNIT ATTENTION
- LOGICAL UNIT RESET
- TARGET RESET
- CLEAR ACA

VSAN-FCP Task Management -Task Attribute

The VSAN-FCP Task Management has an additional **Task Attribute** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

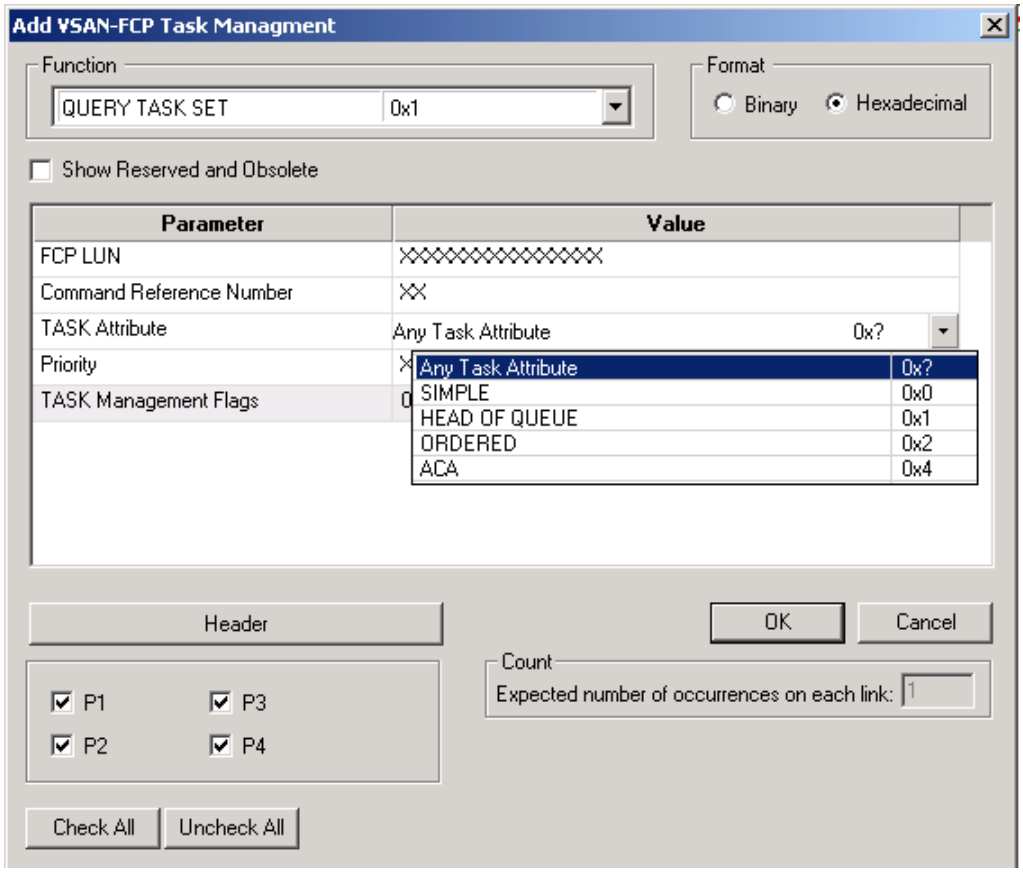


Figure 2.73: VSAN-FCP Task Management Task Attribute Dialog

To select a **Task Attribute** click the dropdown list which has the following options:

- Any Task Attribute
- SIMPLE
- HEAD OF QUEUE
- ORDERED
- ACA

VSAN ARB

Add VSAN-ARB Loop Initialization

Double-click **VSAN-ARB Loop Initialization** in the Patterns Library panel to open the VSAN-ARB Loop Initialization dialog.

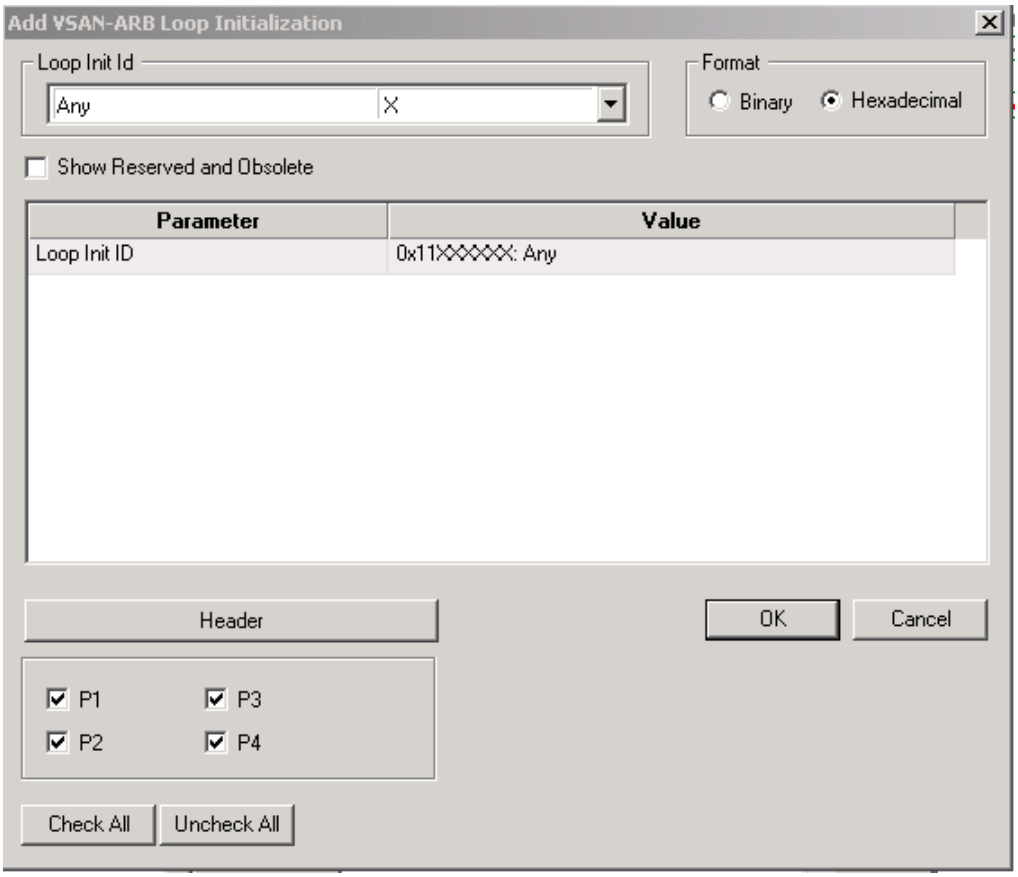


Figure 2.74: VSAN-ARB Loop initialization Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Loop Init Id** click the dropdown list which has the following options:

- Any
- LISM
- LIFA
- LIPA
- LIHA
- LISA
- LIRP
- LILP

VSAN ELS Patterns

VSAN-Extended Link Service - Request

Double-click **VSAN-Extended Link Service - Request** in the Pattern window to open the Add VSAN-Extended Link Service - Request Pattern dialog.

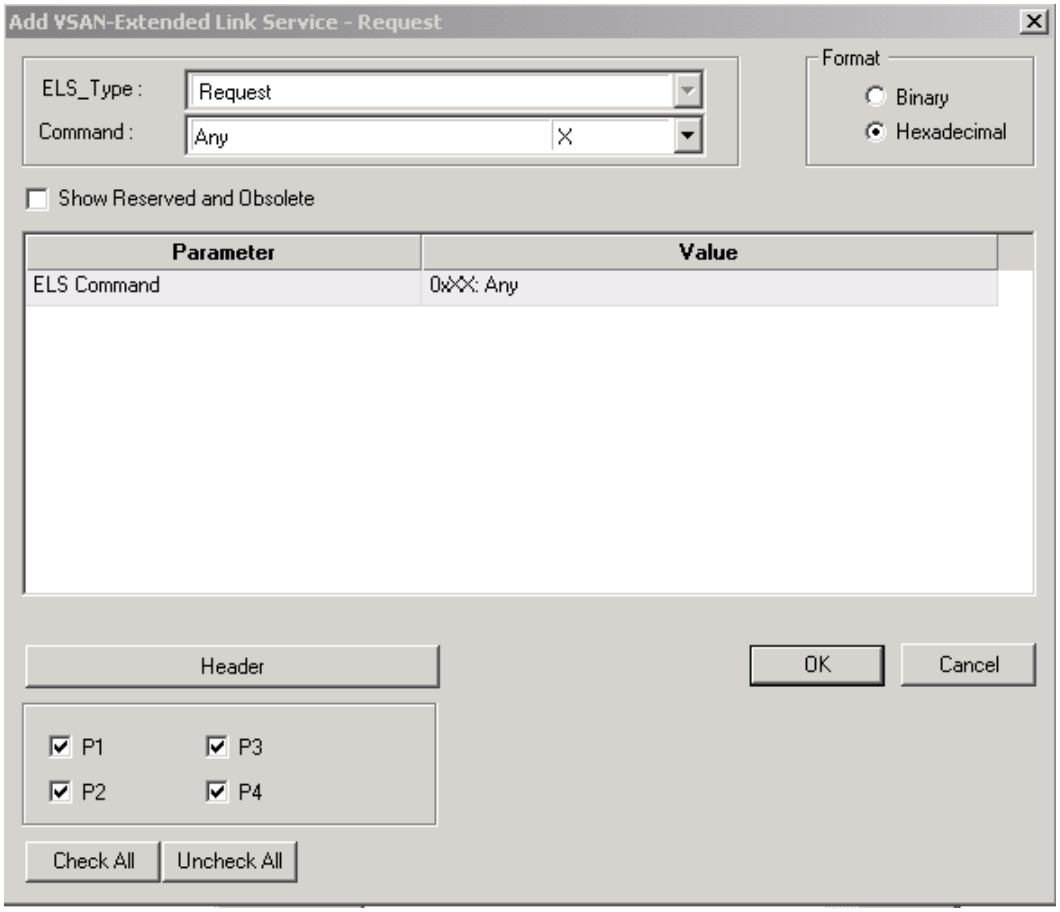


Figure 2.75: VSAN-Extended Link Service - Request Dialog

The format can be **Binary** or **Hexadecimal**.

To select an **ELS_Type** and **Command**, click the dropdown list.

VSAN-Extended Link Service - Request, Reply

Double-click **VSAN-Extended Link Service - Request, Reply** in the Pattern window to open the Add VSAN-Extended Link Service - Request, Reply Pattern dialog.

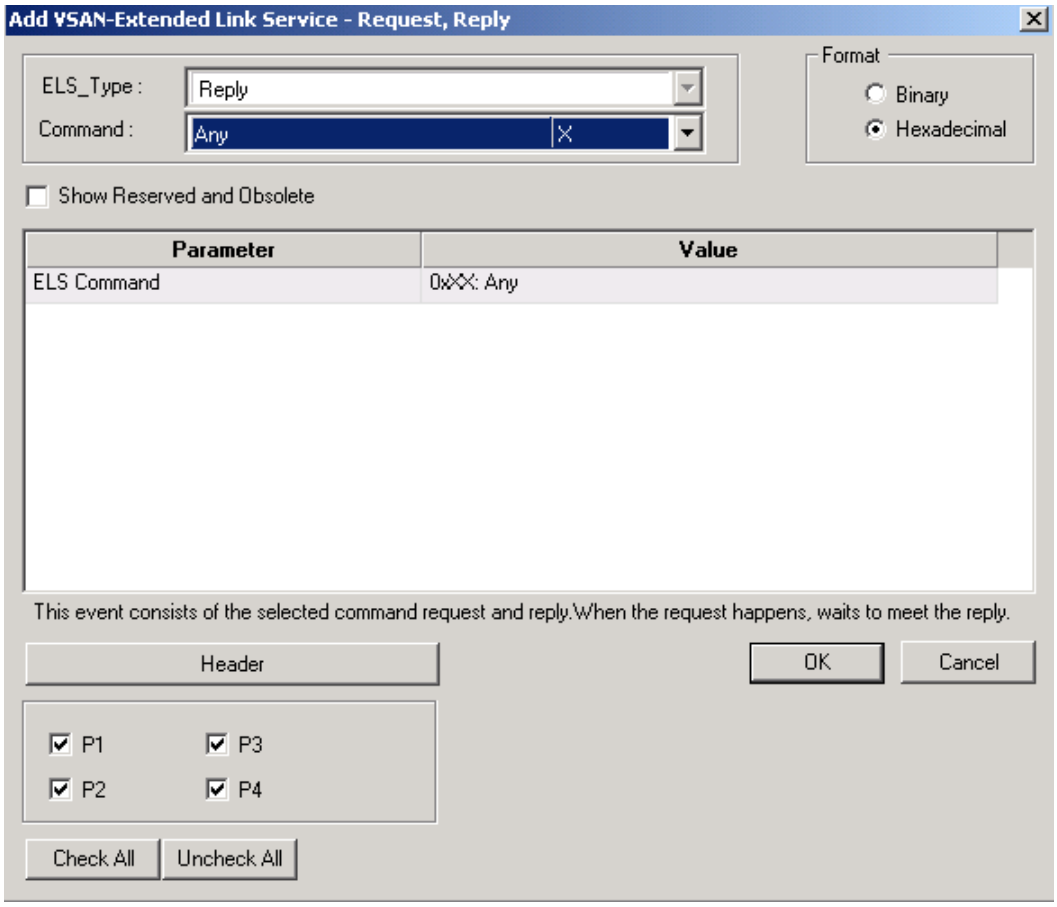


Figure 2.76: Add VSAN- Extended Link Service - Request, Reply Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select an **ELS_Type** and **Command**, click the dropdown list.

VSAN-Extended Link Service - Reply

Double-click **VSAN-Extended Link Service - Reply** in the Pattern window to open the Add VSAN-Extended Link Service - Reply Pattern dialog.

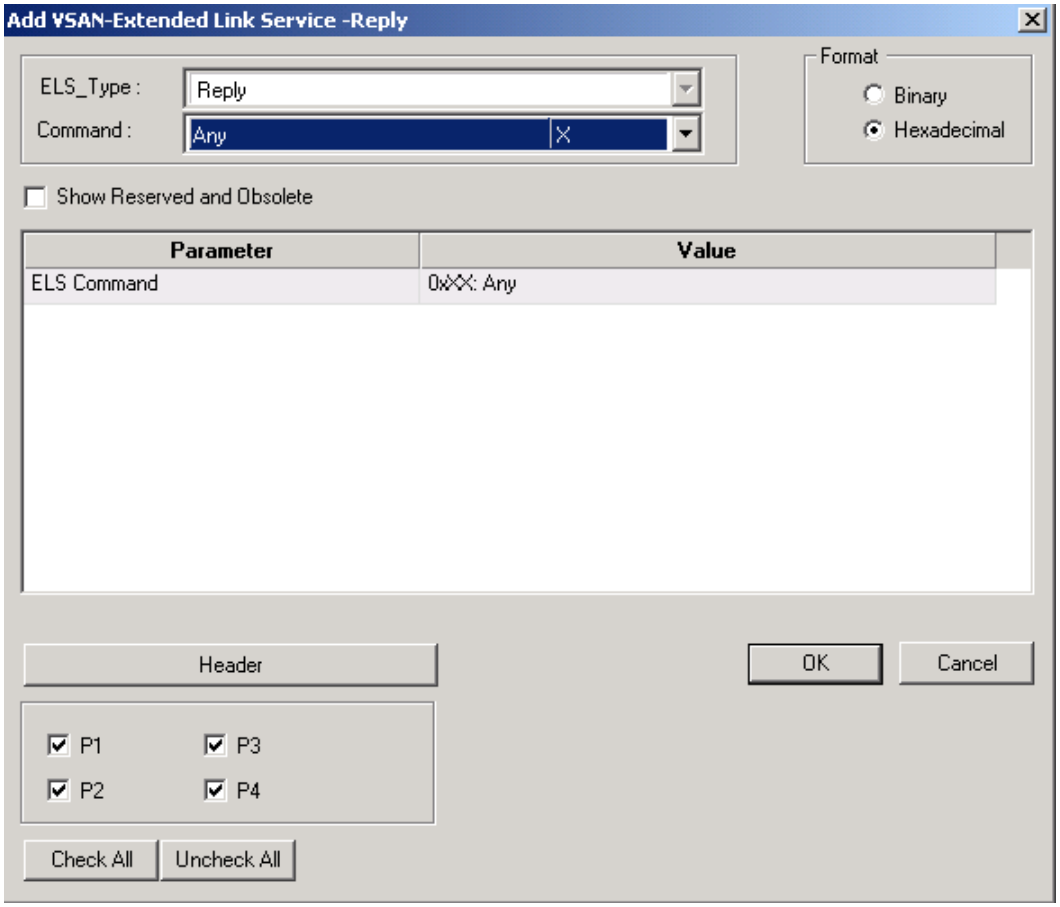


Figure 2.77: VSAN-Extended Link Service - Reply Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select an **ELS_Type** and **Command**, click the dropdown list.

VSAN-GS Patterns

VSAN-Generic Link Service - Request

Double-click VSAN-**Generic Link Service - Request** in the Pattern window to open the Add VSAN-Generic Link Service - Request Pattern dialog.

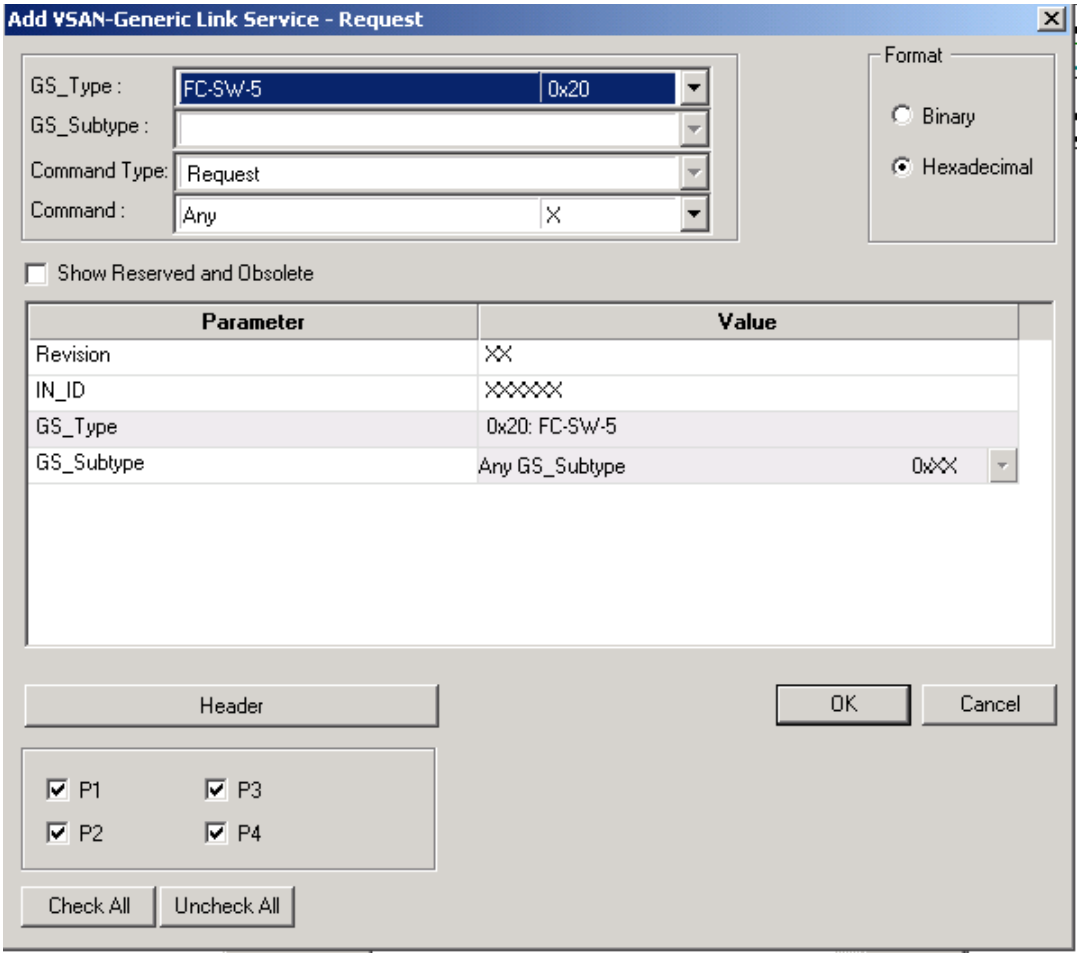


Figure 2.78: VSAN-Generic Link Service - Request Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

Click the dropdown lists to select a **GS_Type**, **GS_Subtype**, **Command Type**, and **Command**. The following GS_Type options are available:

- FC-SW-5
- Event Service
- Key Distribution Service
- Alias Service
- Management Service
- Time Service
- Directory Service

VSAN-Generic Link Service - Request, Reply

Double-click **VSAN-Generic Link Service - Request, Reply** in the Pattern window to open the Add VSAN-Generic Link Service - Request, Reply Pattern dialog.

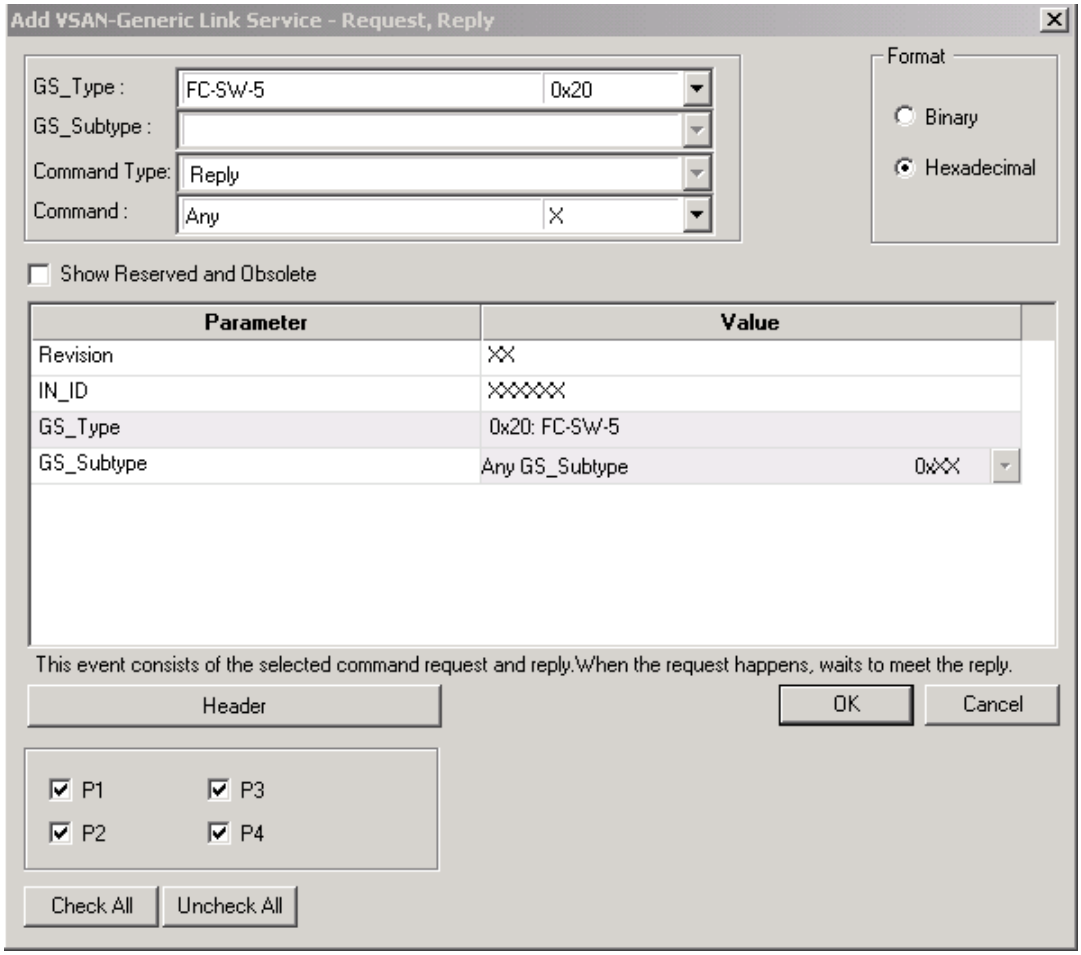


Figure 2.79: VSAN-Generic Link Service-Request, Reply Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

Click the dropdown lists to select a **GS_Type**, **GS_Subtype**, **Command Type**, and **Command**. The following GS_Type options are available:

- FC-SW-5
- Event Service
- Key Distribution Service
- Alias Service
- Management Service
- Time Service
- Directory Service

VSAN-Generic Link Service - Reply

Double-click VSAN-**Generic Link Service - Reply** in the Pattern window to open the Add VSAN-Generic Link Service - Reply Pattern dialog.

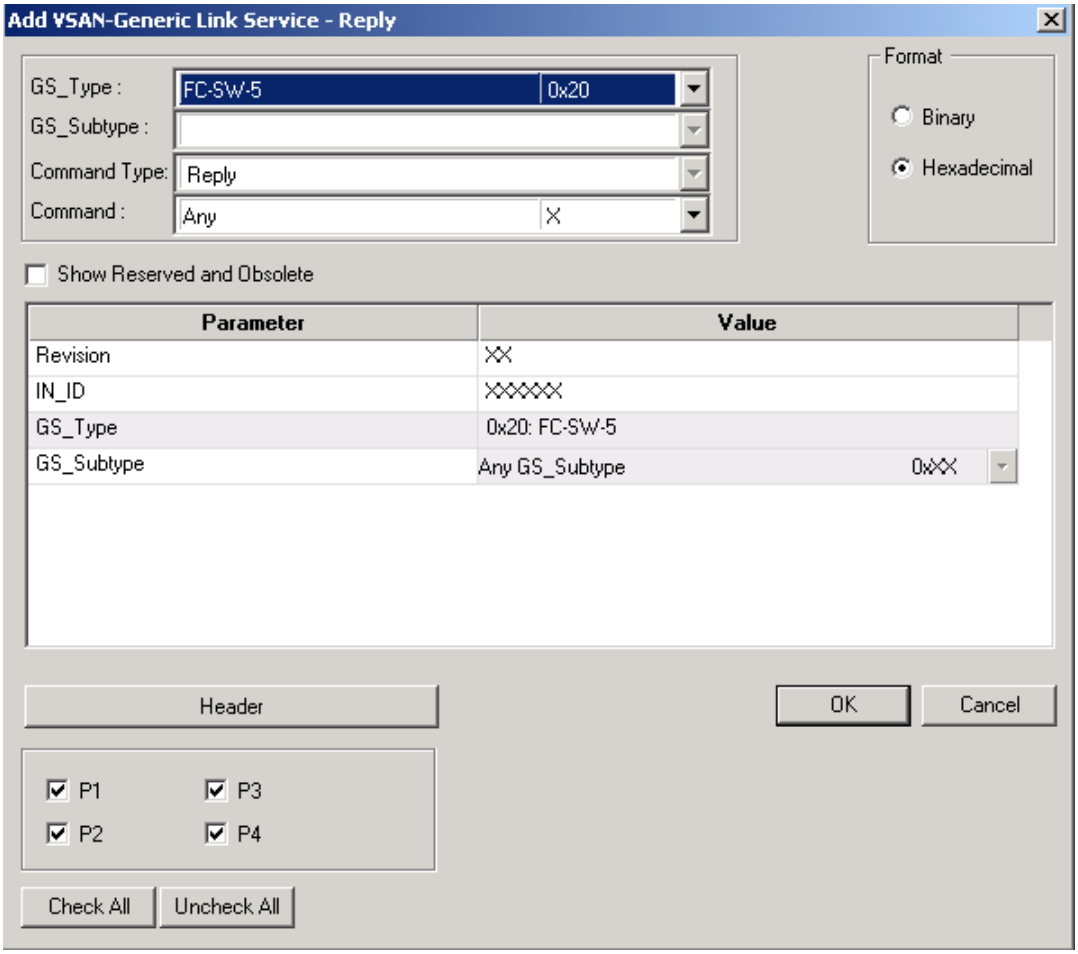


Figure 2.80: VSAN-Generic Link Service - Reply Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

Click the dropdown lists to select a **GS_Type**, **GS_Subtype**, **Command Type**, and **Command**. The following GS_Type options are available:

- FC-SW-5
- Event Service
- Key Distribution Service
- Alias Service
- Management Service
- Time Service
- Directory Service

VSAN-SW Patterns

VSAN-Switch Internal Link Service - Request

Double-click **VSAN-Switch Internal Link Service - Request** in the Pattern window to open the Add VSAN-Switch Internal Link - Request dialog.

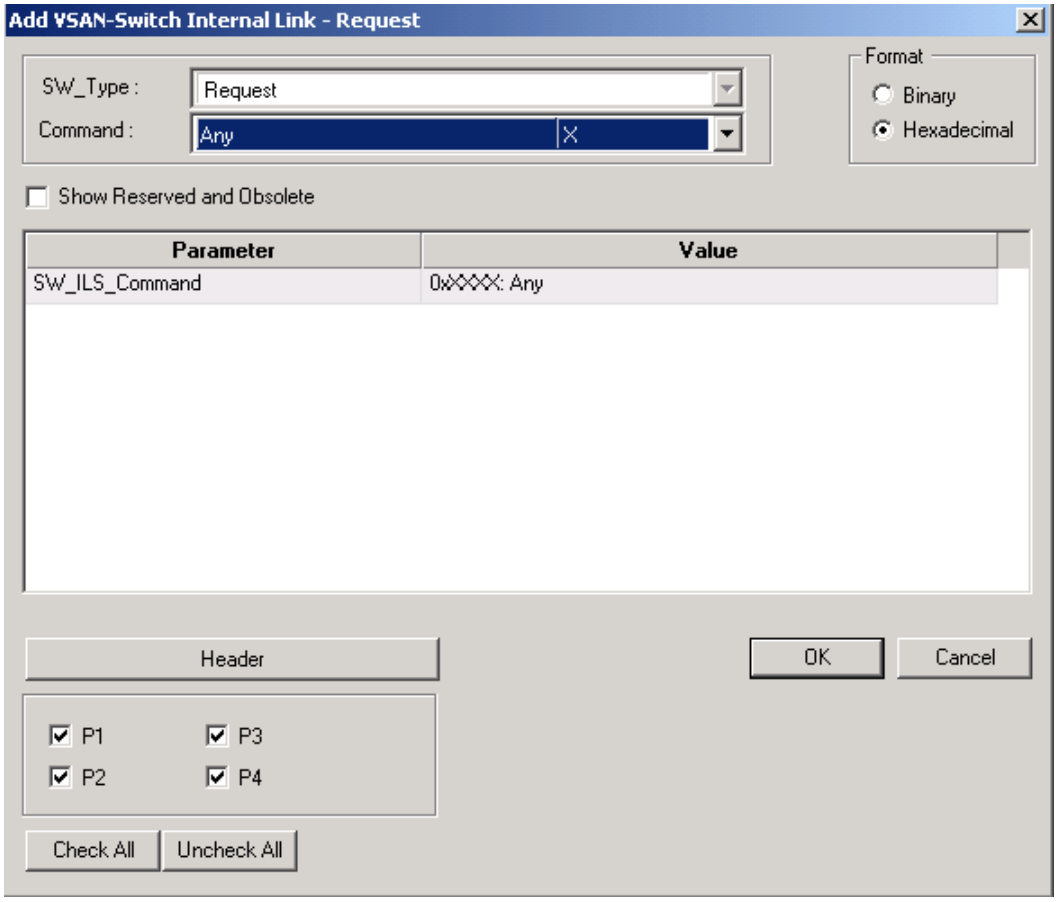


Figure 2.81: VSAN-Switch Internal Link - Request Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **SW_Type** and a **Command** click the dropdown lists.

VSAN-Switch Internal Link Service - Request, Reply

Double-click **Switch Internal Link Service - Request, Reply** in the Pattern window to open the Add Switch Internal Link Service - Request, Reply dialog.

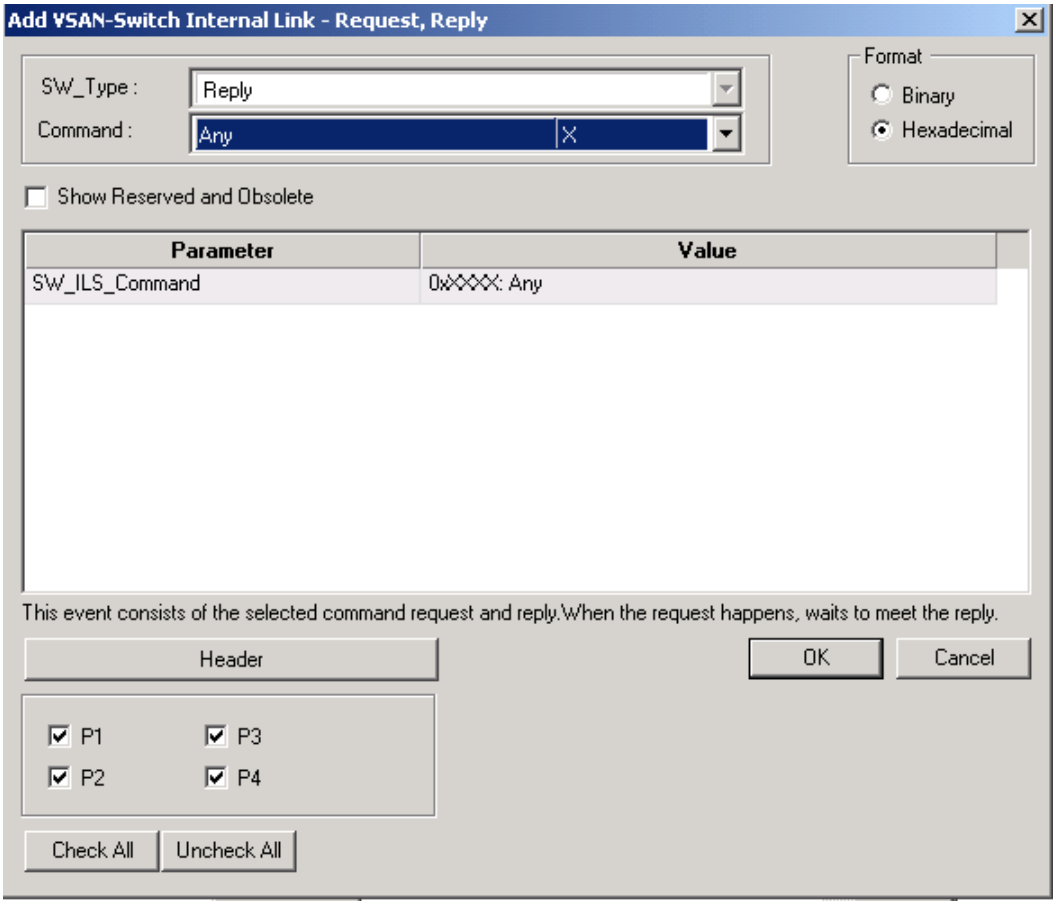


Figure 2.82: VSAN-Switch Internal Link Service - Request, Reply Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **SW_Type** and a **Command** click the dropdown lists.

VSAN-Switch Internal Link Service - Reply

Double-click **VSAN-Switch Internal Link Service - Reply** in the Pattern window to open the Add VSAN-Switch Internal Link Service Pattern dialog.

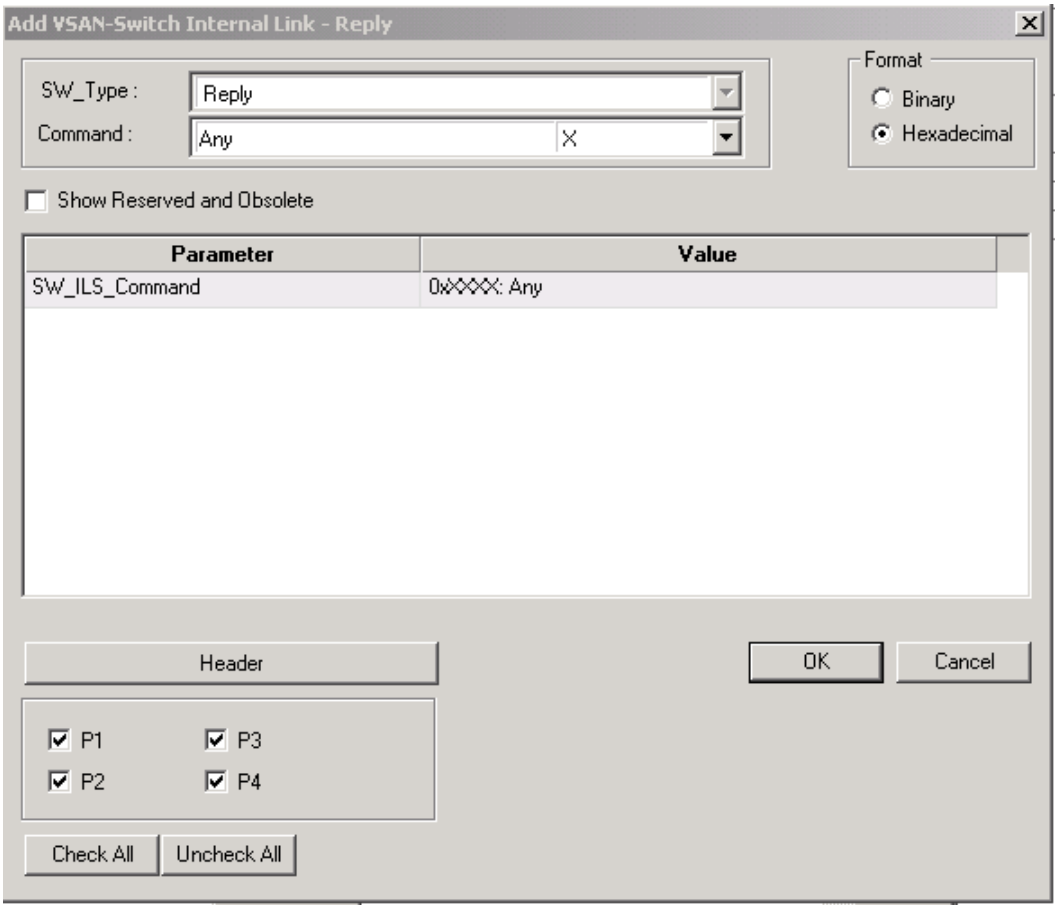


Figure 2.83: VSAN-Switch Internal Link Reply Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **SW_Type** and a **Command** click the dropdown lists.

VSAN-FICON

VSAN-FICON (Any Data Information Block Type)

Double-click **VSAN-FICON(Any Data Information Block Type)** in the Patterns Library panel to open the VSAN-FICON(Any Data Information Block Type) dialog.

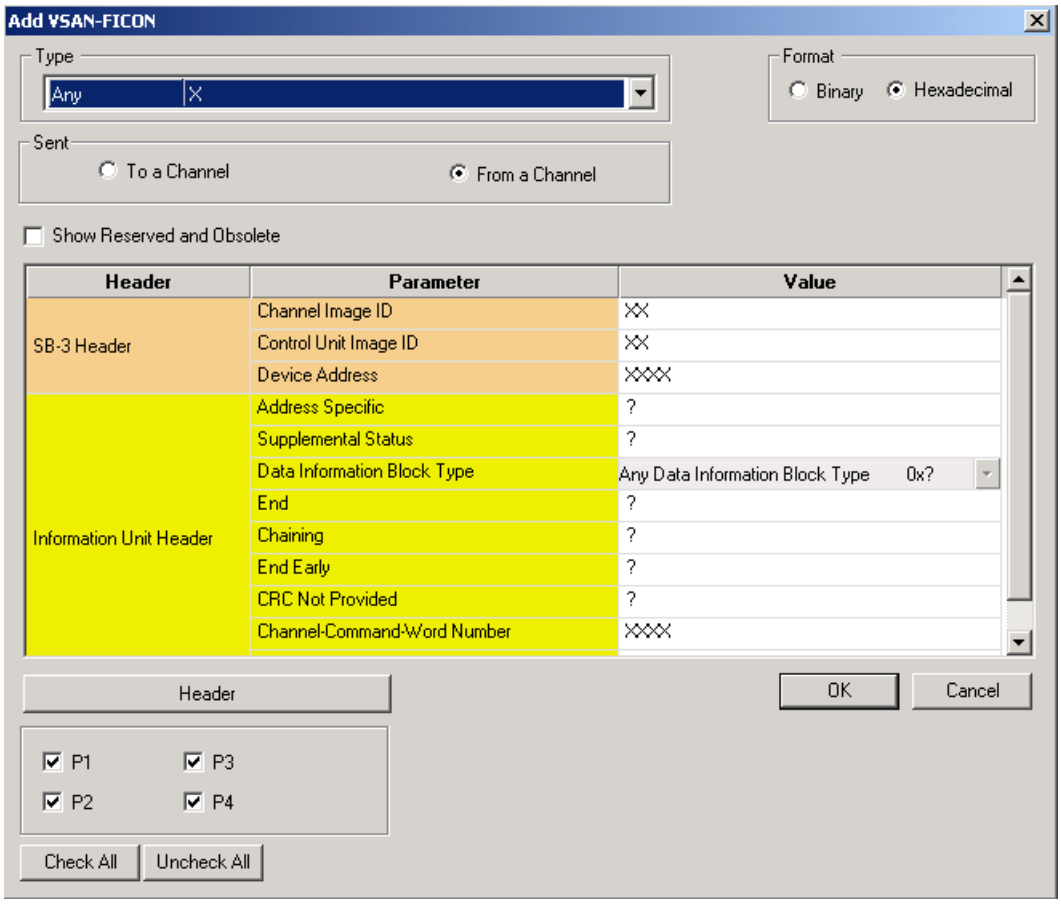


Figure 2.84: VSAN-FICON (Any Data Information Block Type) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

Add VSAN-FICON Data

Double-click **VSAN-FICON(Data)** in the Patterns Library panel to open the VSAN-FICON Data dialog.

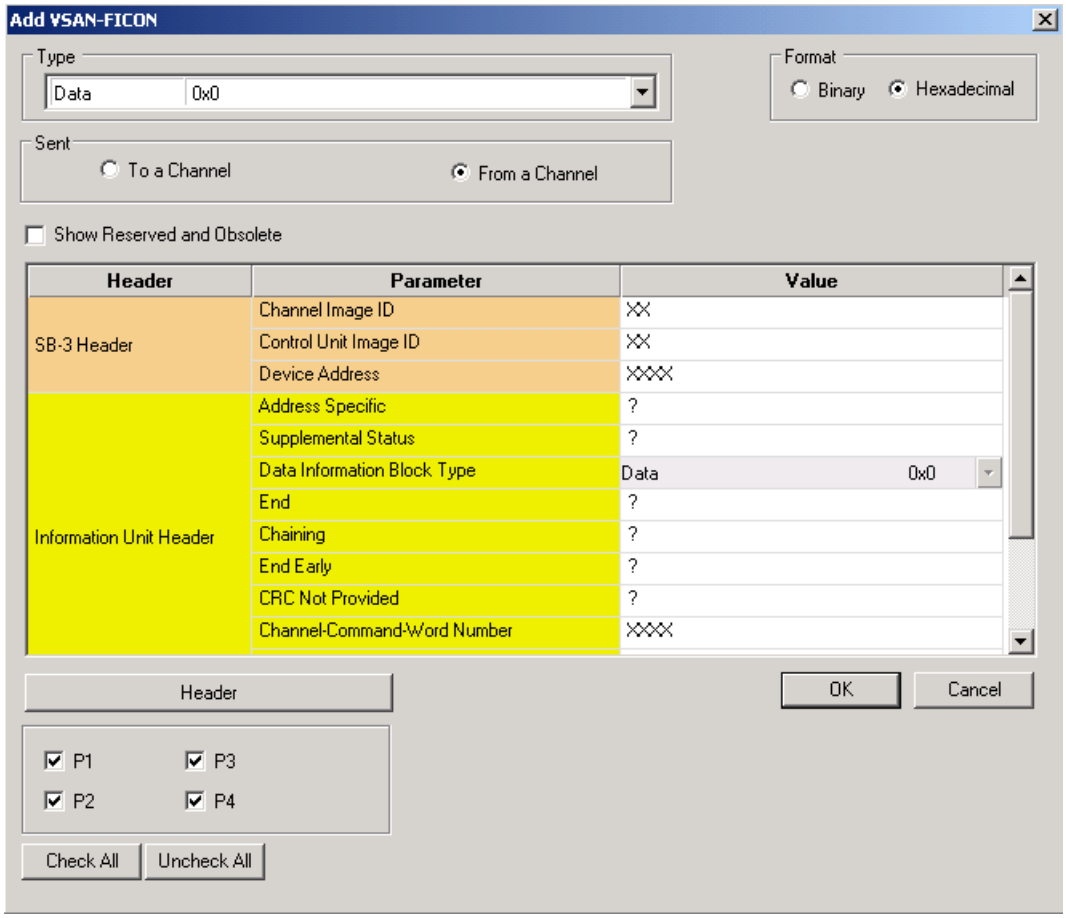


Figure 2.85: VSAN-FICON (Data) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

Add VSAN-FICON Command

Double-click **VSAN-FICON(Command)** in the Patterns Library panel to open the VSAN-FICON Command dialog.

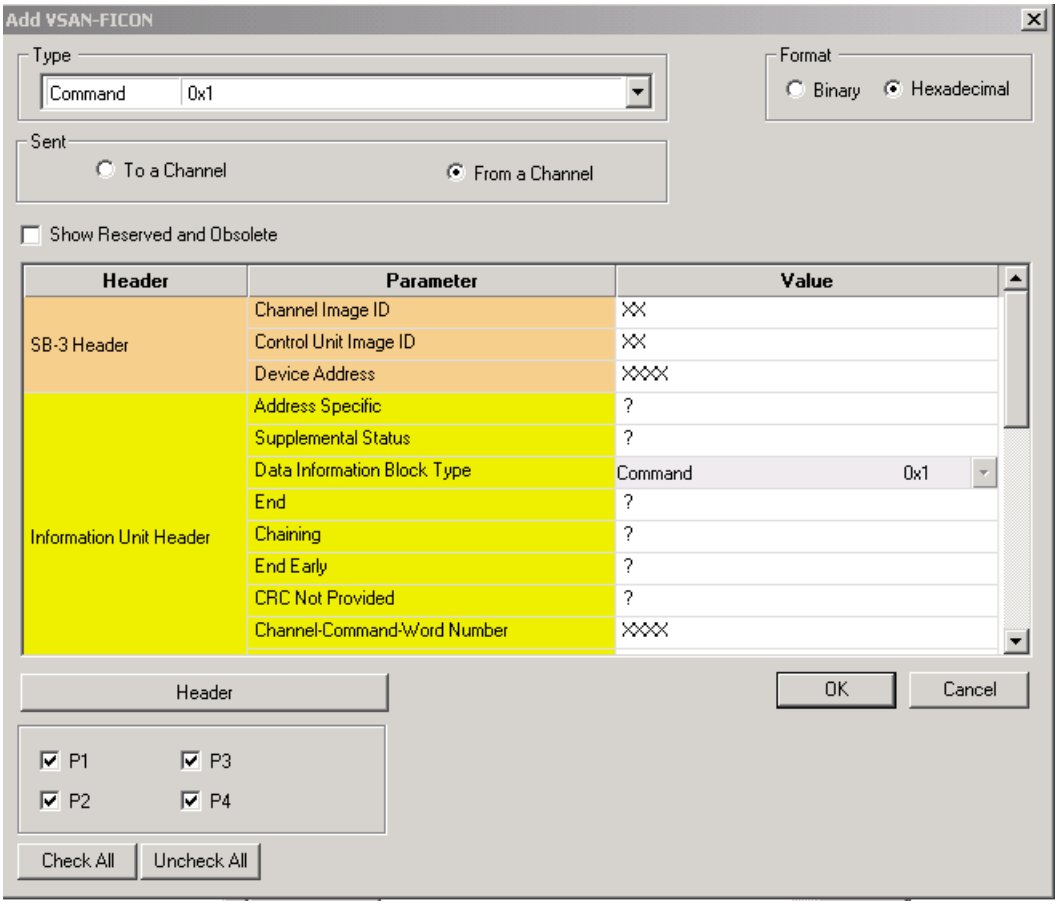


Figure 2.86: VSAN-FICON (Command) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

VSAN-FICON Command-CCW Command Type

The VSAN-FICON[Command] has an additional **CCW Command Type** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

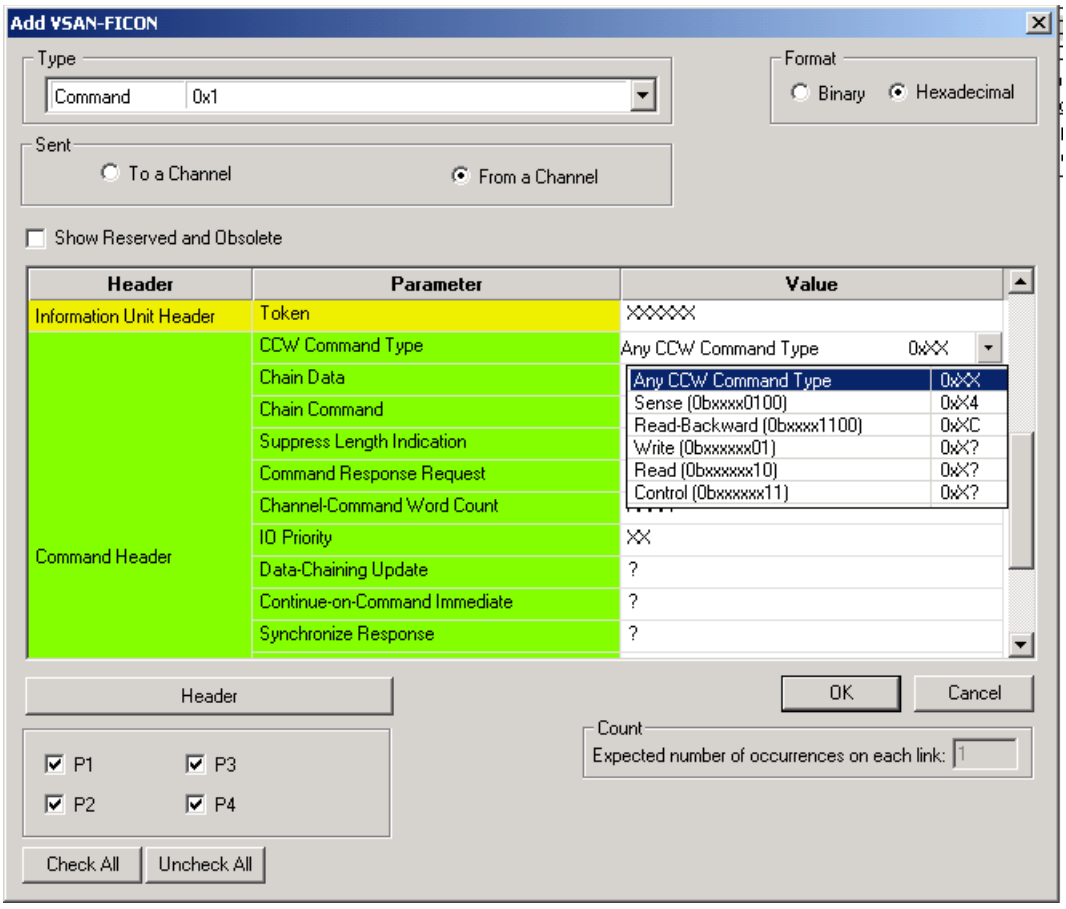


Figure 2.87: VSAN-FICON[Command] - Any CCW Command Type Drop-down List

To select **CCW Command Type** click the dropdown list which has the following options:

- Any CCW Command Type
- Sense
- Read-Backward
- Write
- Read
- Control

Add VSAN-FICON Status

Double-click **VSAN-FICON(Status)** in the Patterns Library panel to open the VSAN-FICON Status dialog.

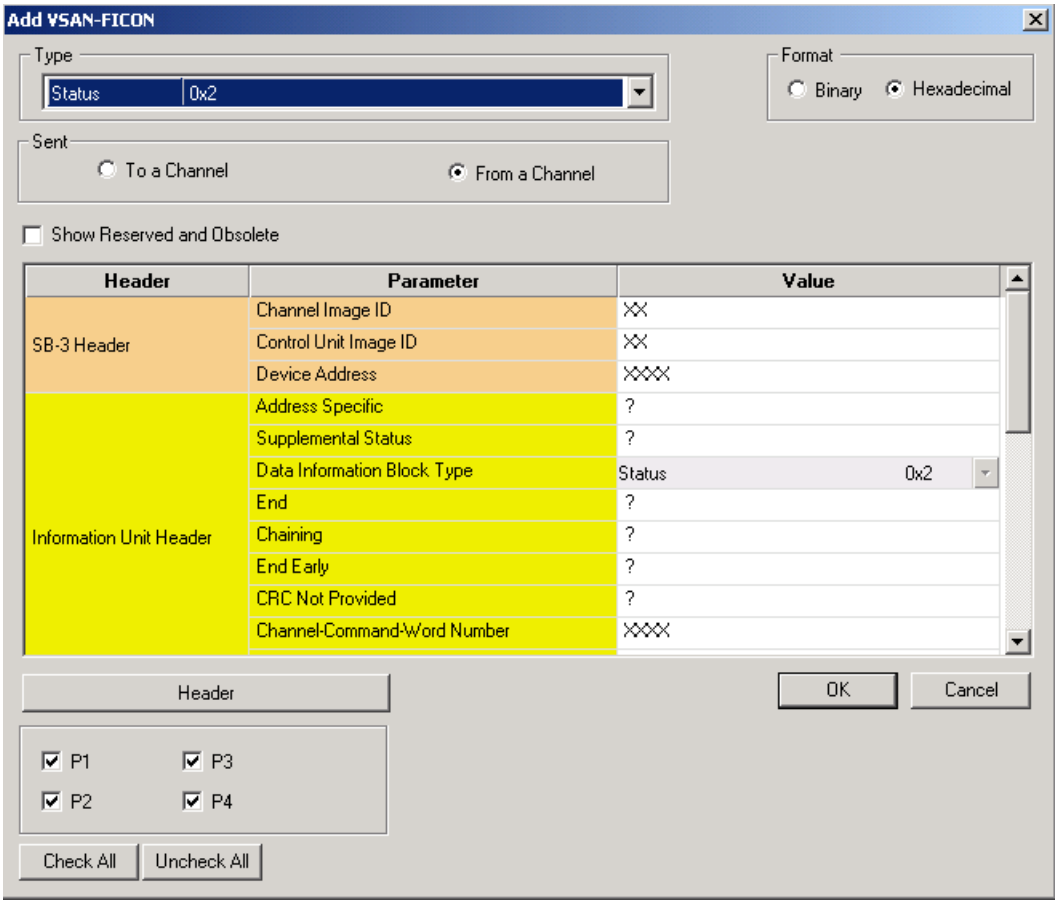


Figure 2.88: FICON (Status) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

VSAN-FICON[Status] - Flag-Field Code

The VSAN-FICON[Status] has an additional **Flag-Field Code** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

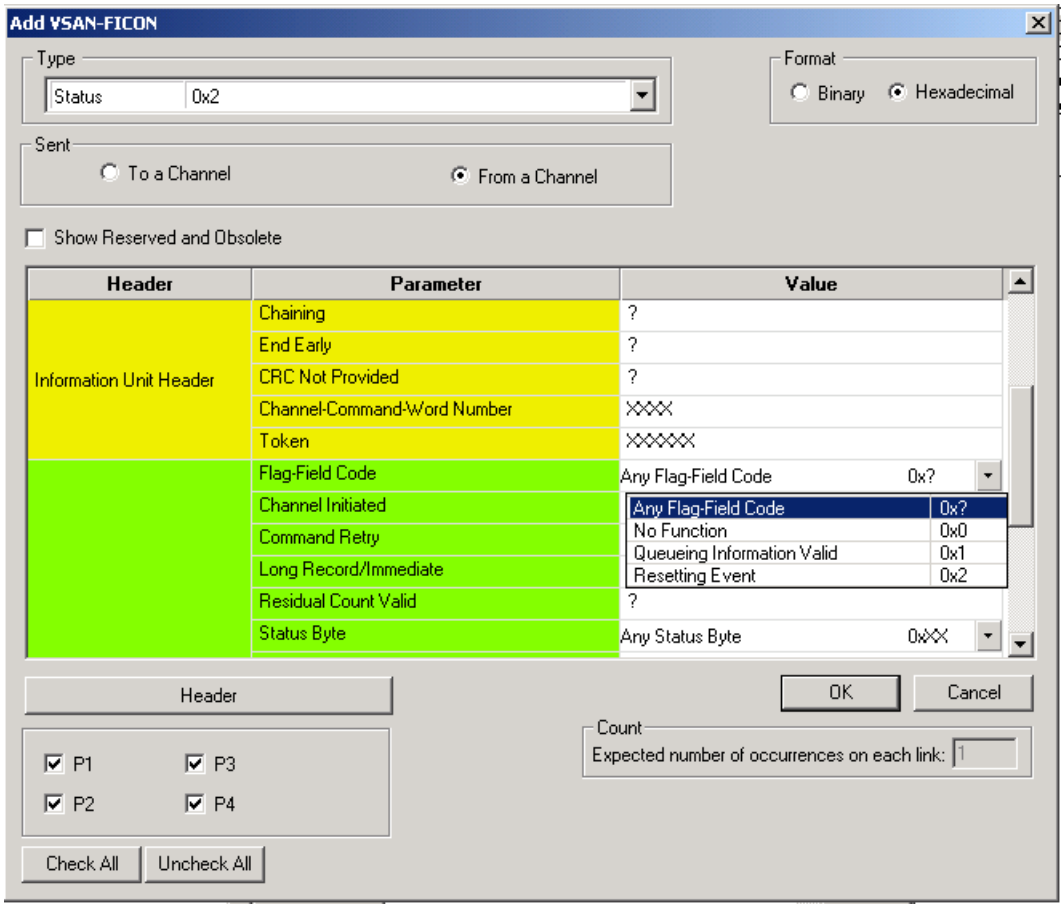


Figure 2.89: VSAN-FICON[Status] - Any Flag-Field Code Drop-down List

To select **Flag-Field Code** click the dropdown list which has the following options:

- Any Flag-Field Code
- No Function
- Queueing Information Valid
- Resetting Event

VSAN-FICON[Status]-Status Byte

The VSAN-FICON[Status] has an additional **Status Byte** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

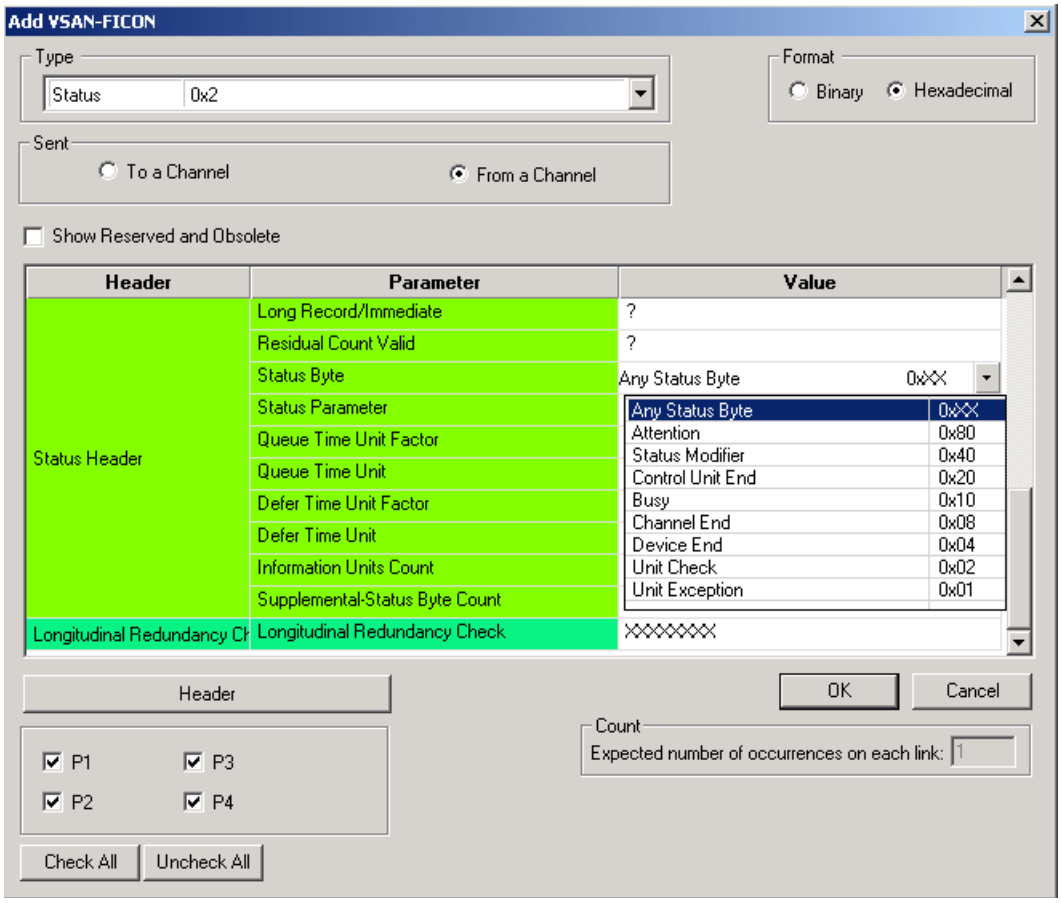


Figure 2.90: VSAN-FICON[Status] - Status Byte Drop-down List

To select **Status Byte** click the dropdown list which has the following options:

- Any Status Byte
- Attention
- Status Modifier
- Control Unit End
- Busy
- Channel End
- Device End
- Unit Check
- Unit Exception

Add VSAN-FICON Control

Double-click **VSAN-FICON(Control)** in the Patterns Library panel to open the VSAN-FICON Control dialog.

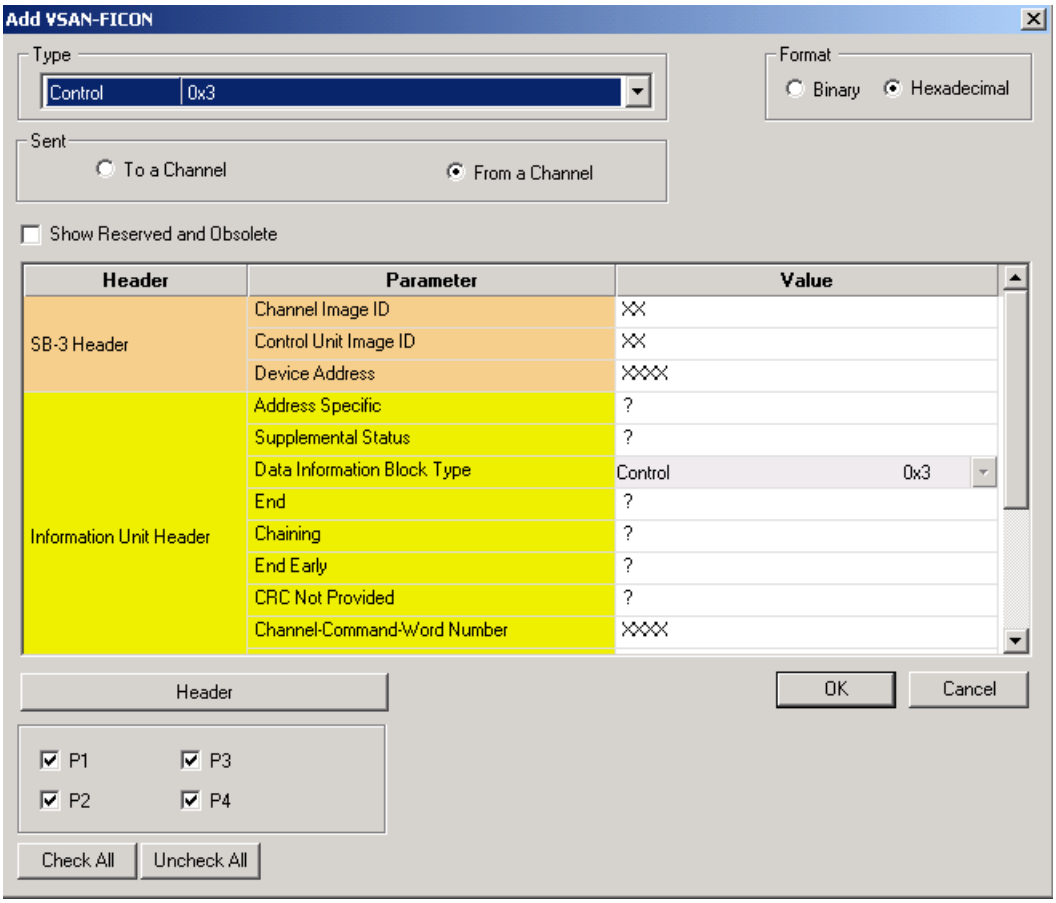


Figure 2.91: VSAN-FICON (Control) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

VSAN- FICON[Control]-Control Function

The VSAN-FICON[Control] has an additional **Control Function** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

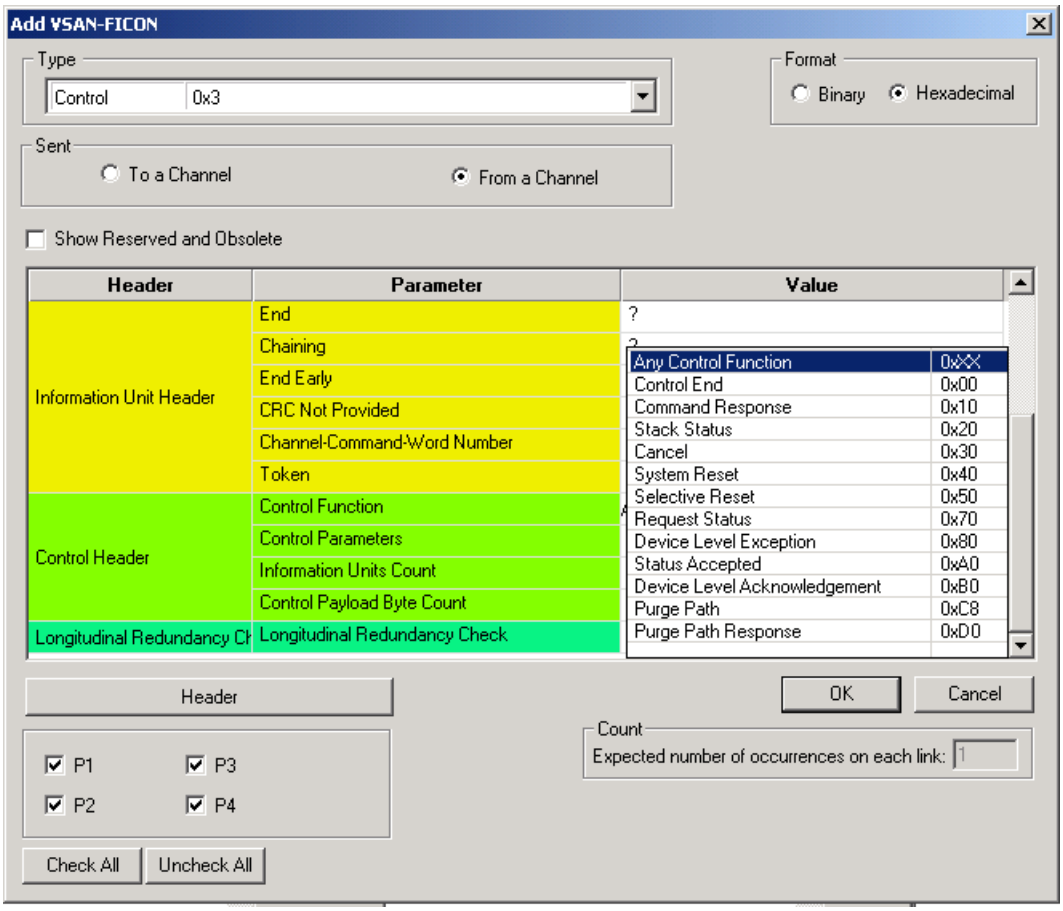


Figure 2.92: VSAN-FICON[Control] - Any Control Function Drop-down List

To select a **Control Function** click the dropdown list which has the following options:

- Any Control Function
- Control End
- Command Response
- Stack Status
- Cancel
- System Request
- Selective Reset
- Request Status
- Device Level Exception
- Status Accepted
- Device Level Acknowledgement
- Purge Path
- Purge Path Response

Add VSAN-FICON Command-Data

Double-click VSAN-**FICON(Command-Data)** in the Patterns Library panel to open the VSAN-FICON Command Data dialog.

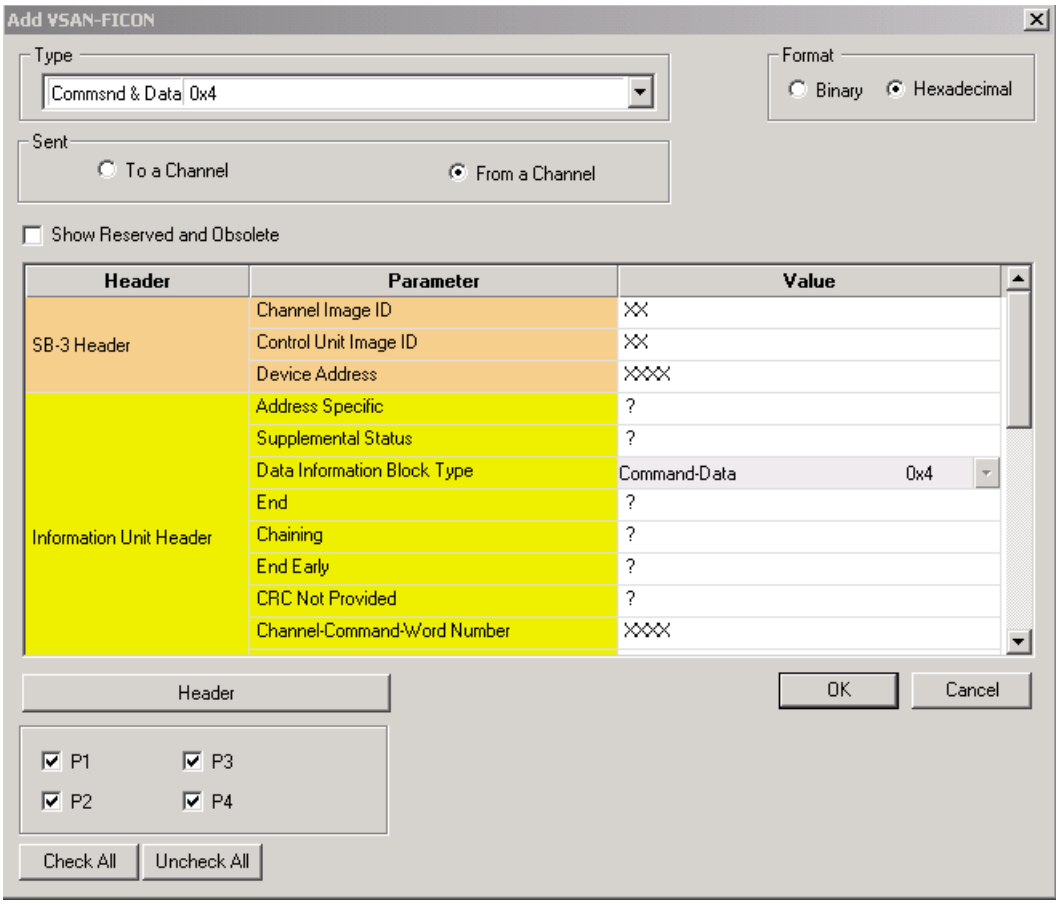


Figure 2.93: VSAN-FICON (Command Data) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

VSAN-FICON[Command]-CCW Command Type

The VSAN-FICON[Command-Data] has an additional **CCW Command Type** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

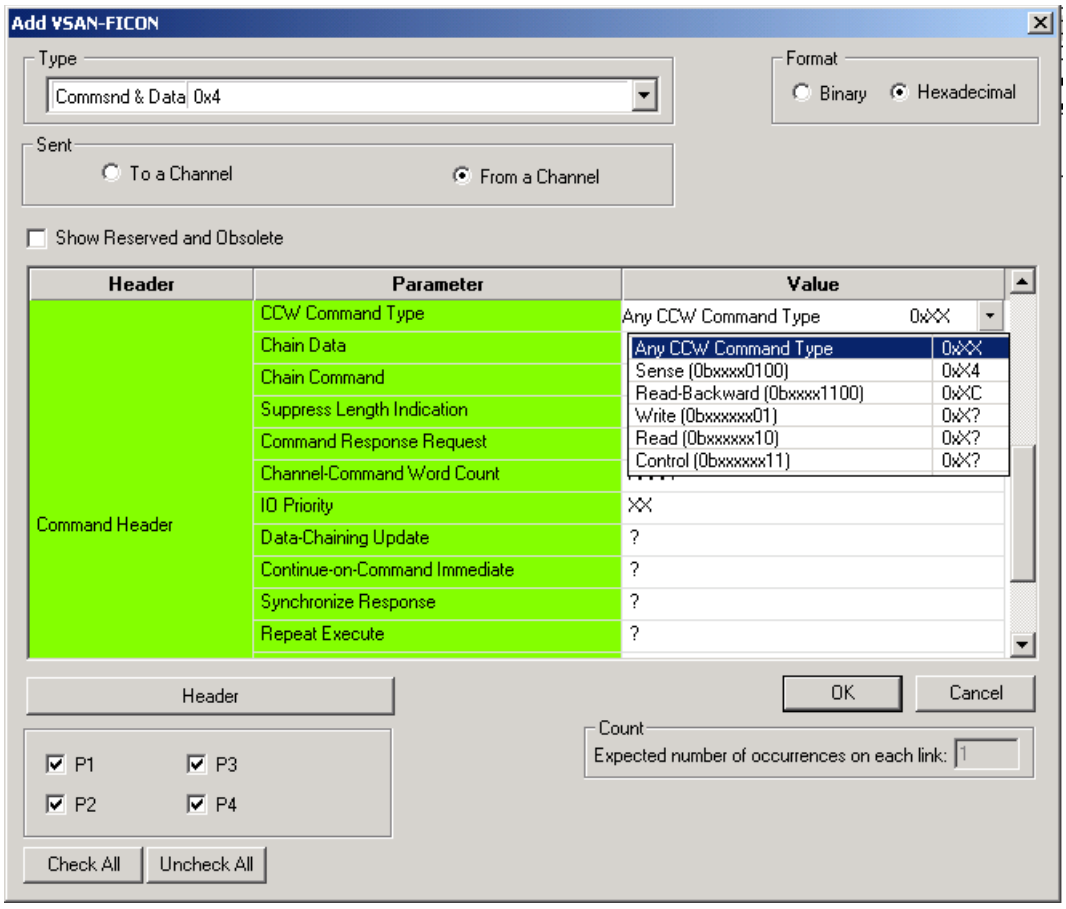


Figure 2.94: VSAN-FICON[Command-Data] - Any CCW Command Type Drop-down List

To select **CCW Command Type** click the dropdown list which has the following options:

- Any CCW Command Type
- Sense
- Read-Backward
- Write
- Read
- Control

Add VSAN-FICON Link-Control

Double-click VSAN-**FICON(Link-Control)** in the Patterns Library panel to open the VSAN-FICON Link Control dialog.

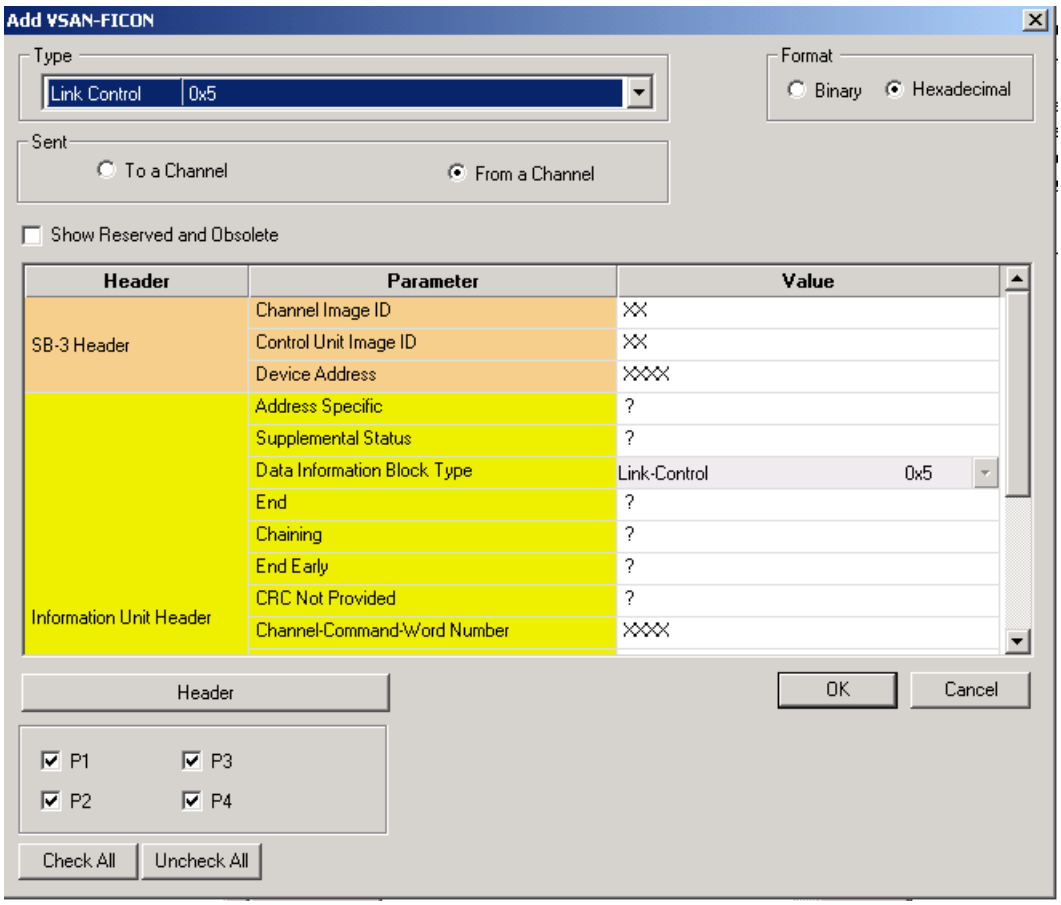


Figure 2.95: VSAN-FICON (Link-Control) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status
- Control
- Command and Data
- Link Control

VSAN-FICON[Link Control]- Link Control Function

The VSAN-FICON[Link Control] has an additional **Link Control Function** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

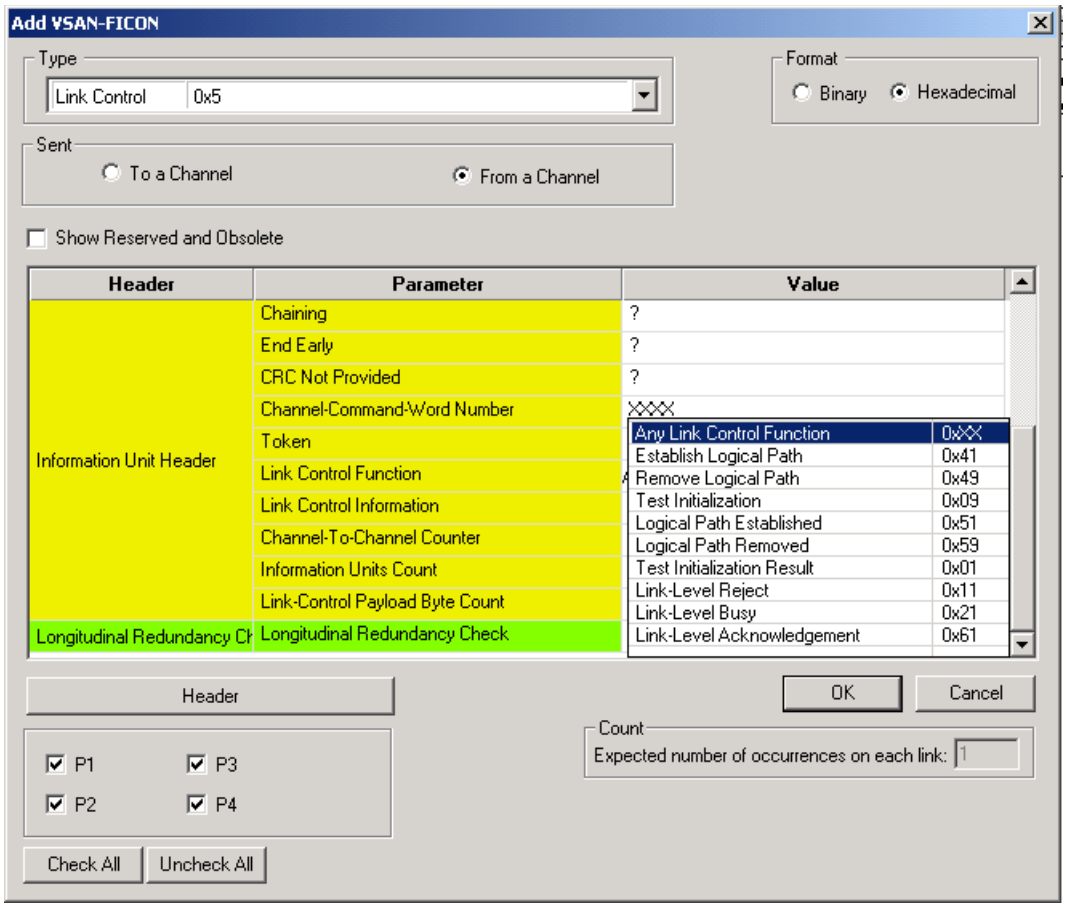


Figure 2.96: VSAN-FICON[Link Control] - Any Link Control Function Drop-down List

To select a **Link Control Function** click the dropdown list which has the following options:

- Any Link Control Function
- Establish Logical Path
- Remove Logical Path
- Test Initialization
- Logical Path Established
- Logical Path Removed
- Test Initialization Result
- Link-Level Reject
- Link-Level Busy
- Link-Level Acknowledgement

VSAN FCAE

VSAN-FCAE-ASM

Double-click **VSAN-FCAE-ASM** in the Patterns Library panel to open the VSAN-FCAE-ASM dialog to add any Type of VSAN-FCAE-ASM.

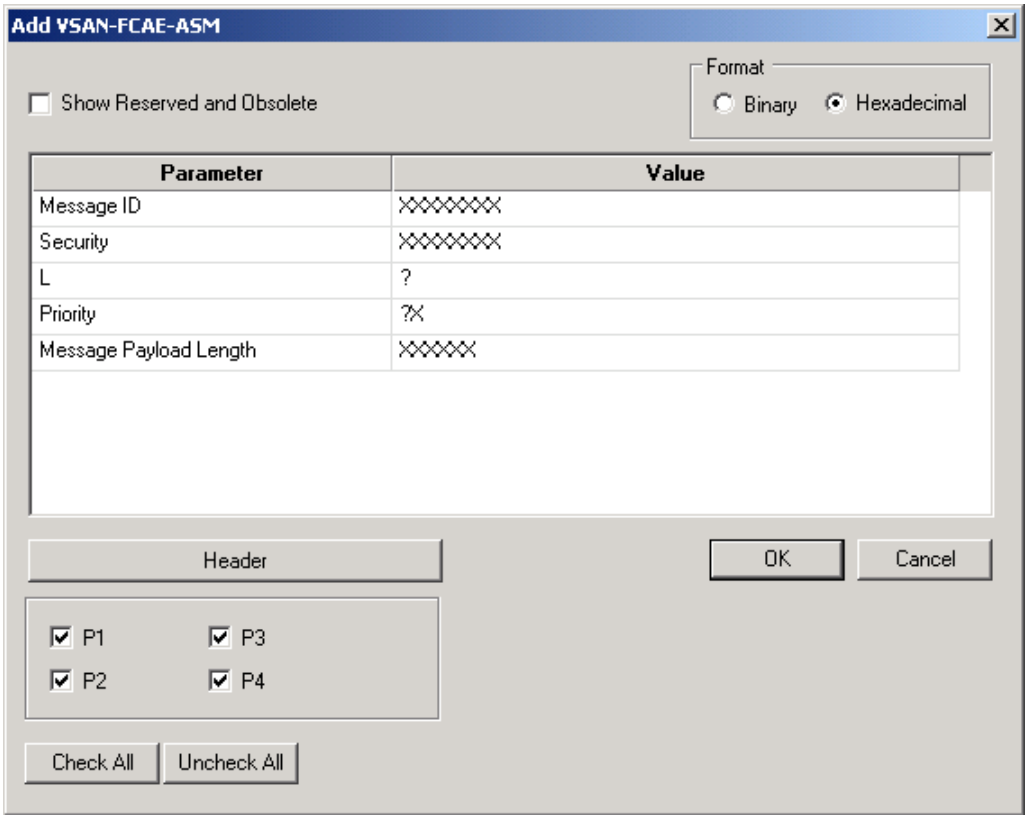


Figure 2.97: VSAN-FCAE-ASM Dialog

The format can be **Binary** or **Hexadecimal**.

VSAN-FCAE-1553

VSAN-FCAE-1553 Any

Double-click **VSAN-FCAE-1553(Any)** in the Patterns Library panel to open the VSAN-FCAE-1553 dialog to add any Type of VSAN-FCAE-1553.

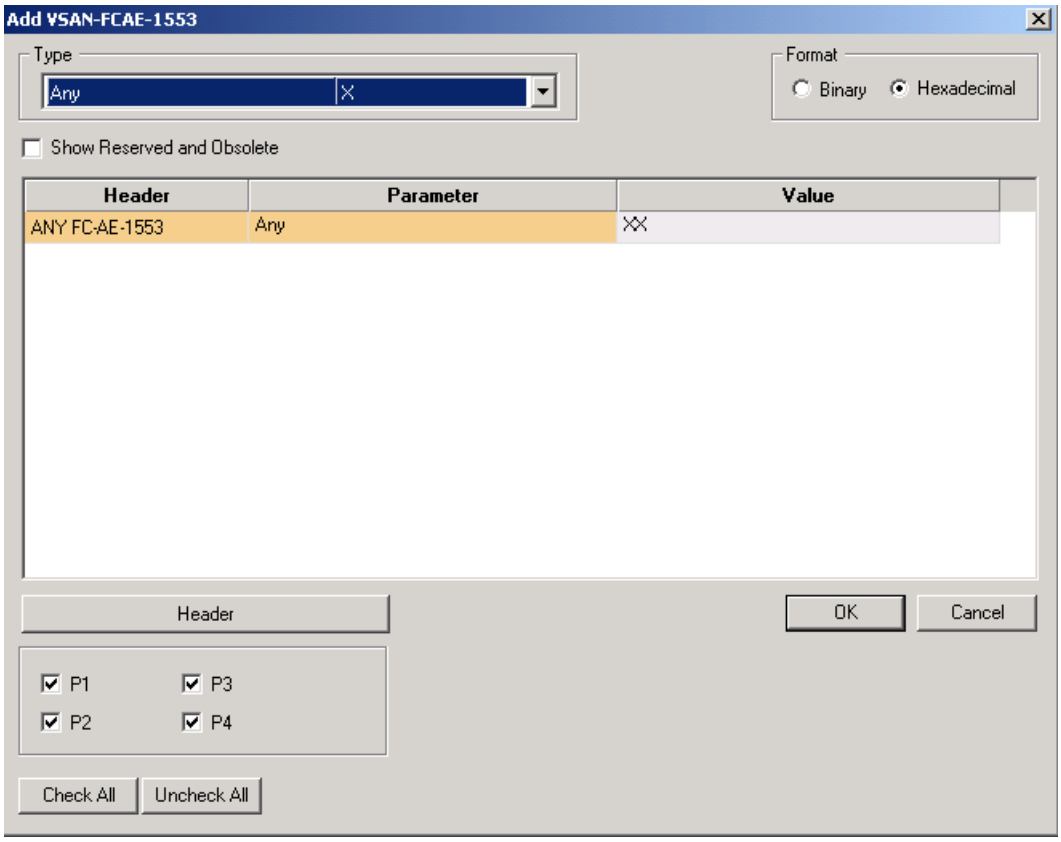


Figure 2.98: VSAN-FCAE-1553 (Any) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status

Add VSAN-FCAE-1553 Data

Double-click VSAN-**FCAE-1553(Data)** in the Patterns Library panel to open the VSAN-FCAE-1553 Data dialog.

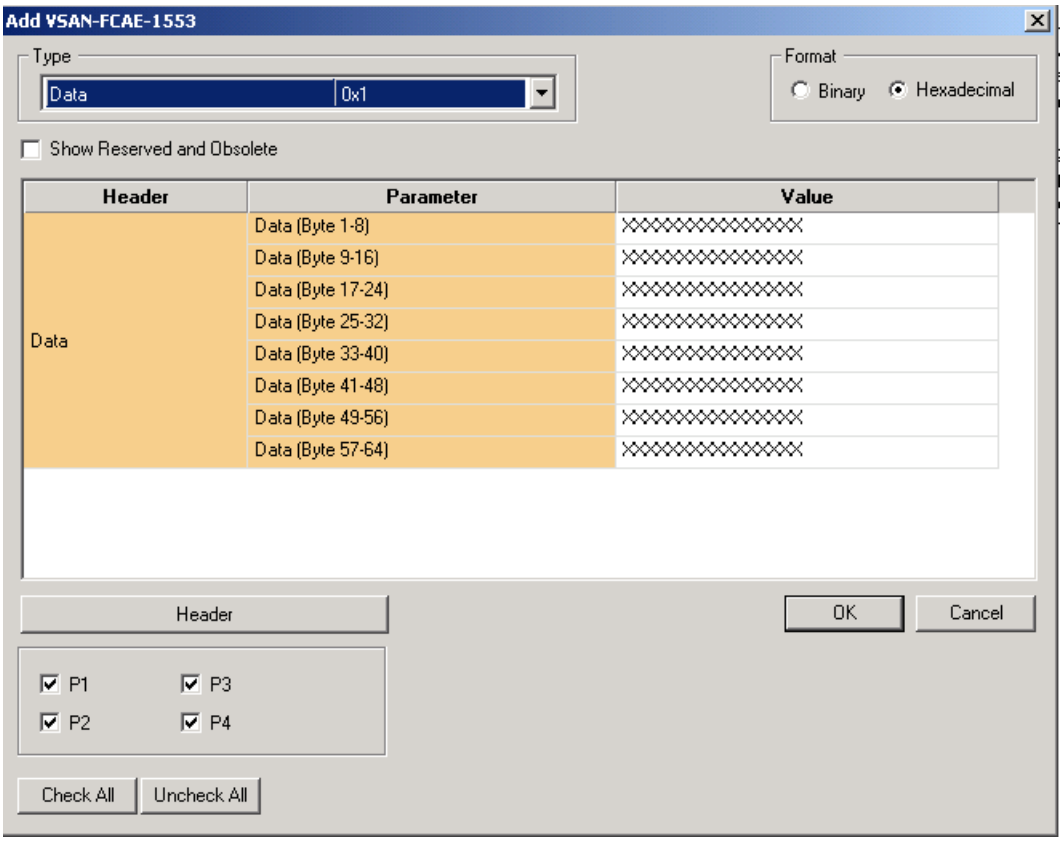


Figure 2.99: VSAN-FCAE-1553(Data) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status

Add FCAE-1553 Command

Double-click **VSAN-FCAE-1553(Command)** in the Patterns Library panel to open the VSAN-FCAE-1553 Command dialog.

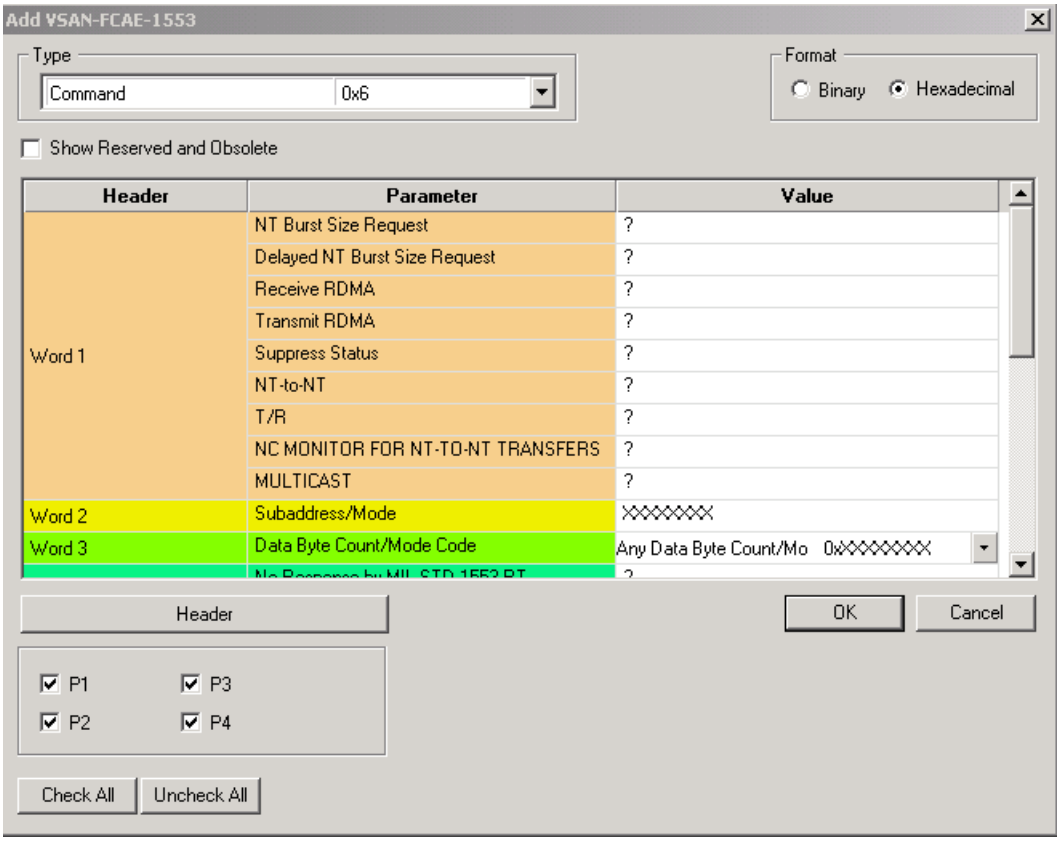


Figure 2.100: VSAN-FCAE-1553 (Command) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status

VSAN-FCAE-1553[Command]- Data Byte Count /Mode Code

The VSAN-FCAE-1553[Command] has an additional **Data Byte Count /Mode Code** dropdown menu under the **Value** pane on the right of the dialog as shown in Figure 2.101. The dropdown menu items could be truncated, hover the mouse over the option to see the full menu option (see the following figure).

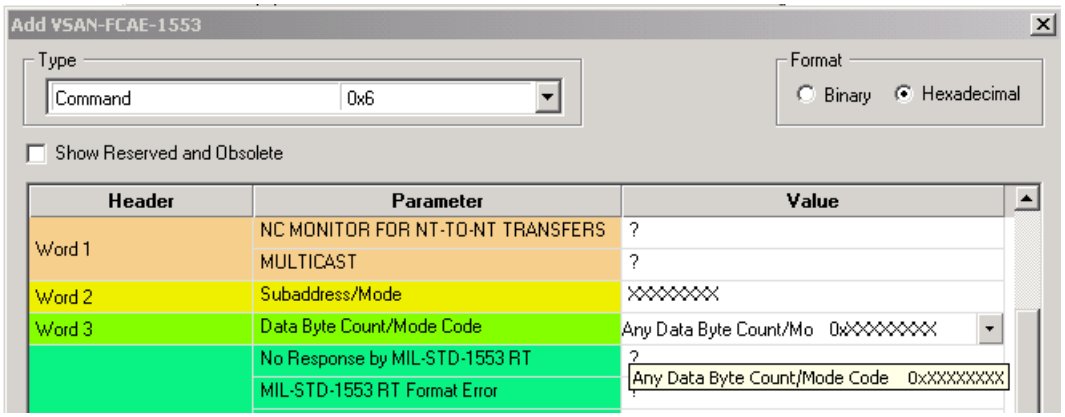


Figure 2.101: Hover the Mouse to see the Full Menu Option

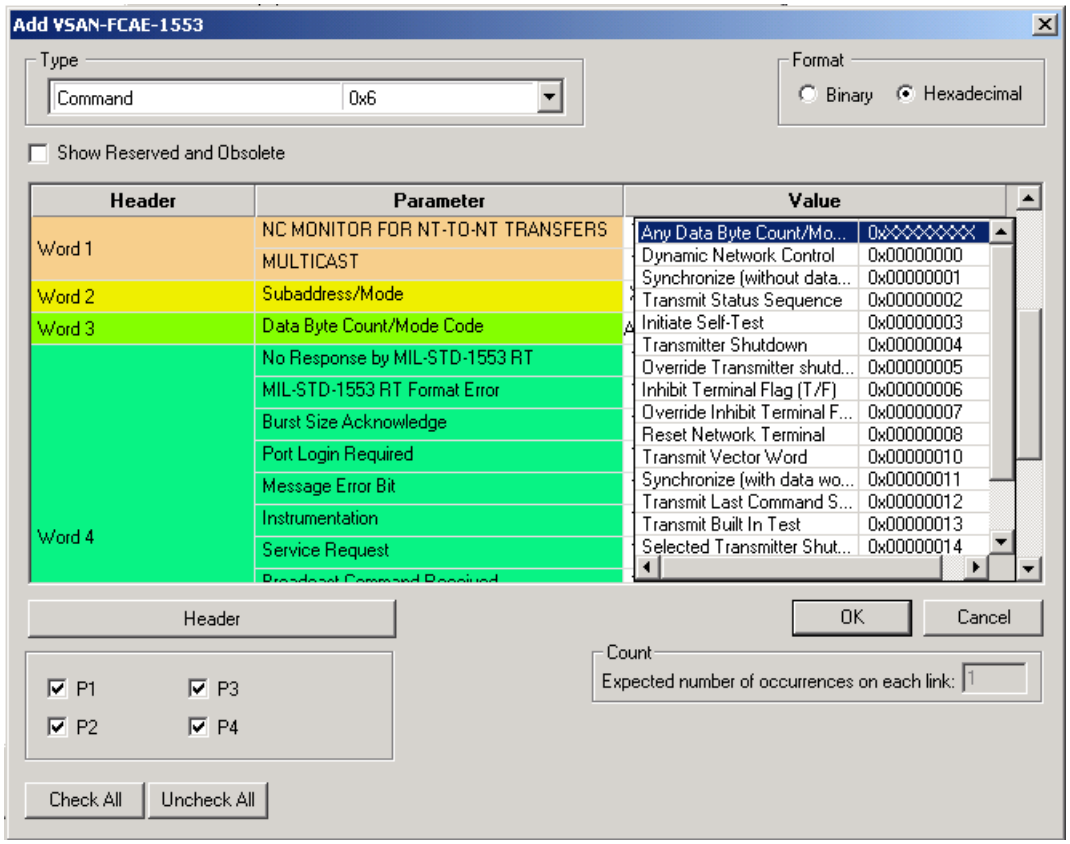


Figure 2.102: VSAN-FCAE-1553[Command]- Data Byte Count/Mode Code Drop-down List

To select **Data Byte Count/Mode Code** click the dropdown list which has the following options:

- Any Data Byte Count/Mode Code
- Dynamic Network Control
- Synchronize (without data word)
- Transmit Status Sequence
- Initiate Self-Test
- Transmitter Shutdown
- Override Transmitter shutdown
- Inhibit Terminal Flag (T/F)
- Override Inhibit Terminal Flag
- Reset Network Terminal
- Transmit Vector Word
- Synchronize (with data word)
- Transmit Last Command Sequence
- Transmit Built In test
- Selected Transmitter Shutdown
- Override Selected Transmitter Shutdown
- Transmit RT Address
- Transmit NT_C-D/S_BURST_TOV

Add VSAN-FCAE-1553 Status

Double-click **VSAN-FCAE-1553(Status)** in the Patterns Library panel to open the VSAN-FCAE-1553 Status dialog.

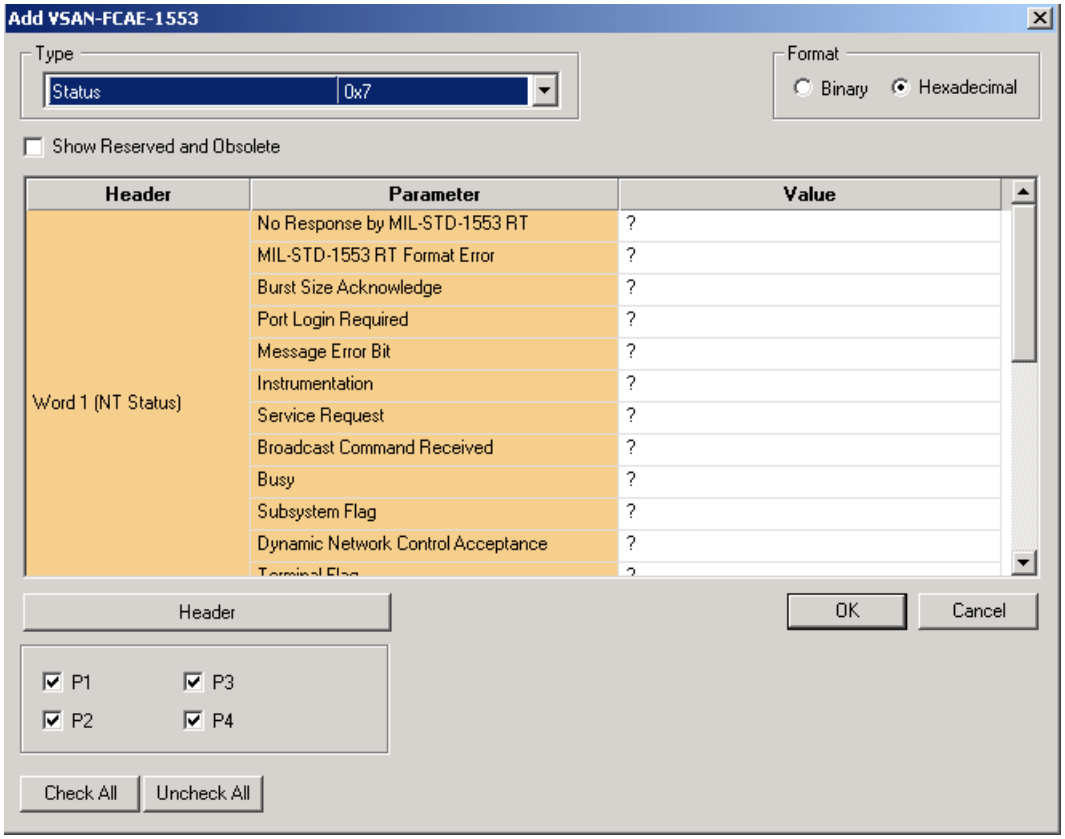


Figure 2.103: VSAN-FCAE-1553 (Status) Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Type** click the dropdown list which has the following options:

- Any
- Data
- Command
- Status

VSAN FCAE-RDMA FCP SCSI Command - With Target Notification

Double-click **VSAN FCAE RDMA FCP SCSI Command-With Target Notification** in the Patterns Library panel to open the Add VSAN RDMA FCP SCSI Command-With Target Notification dialog.

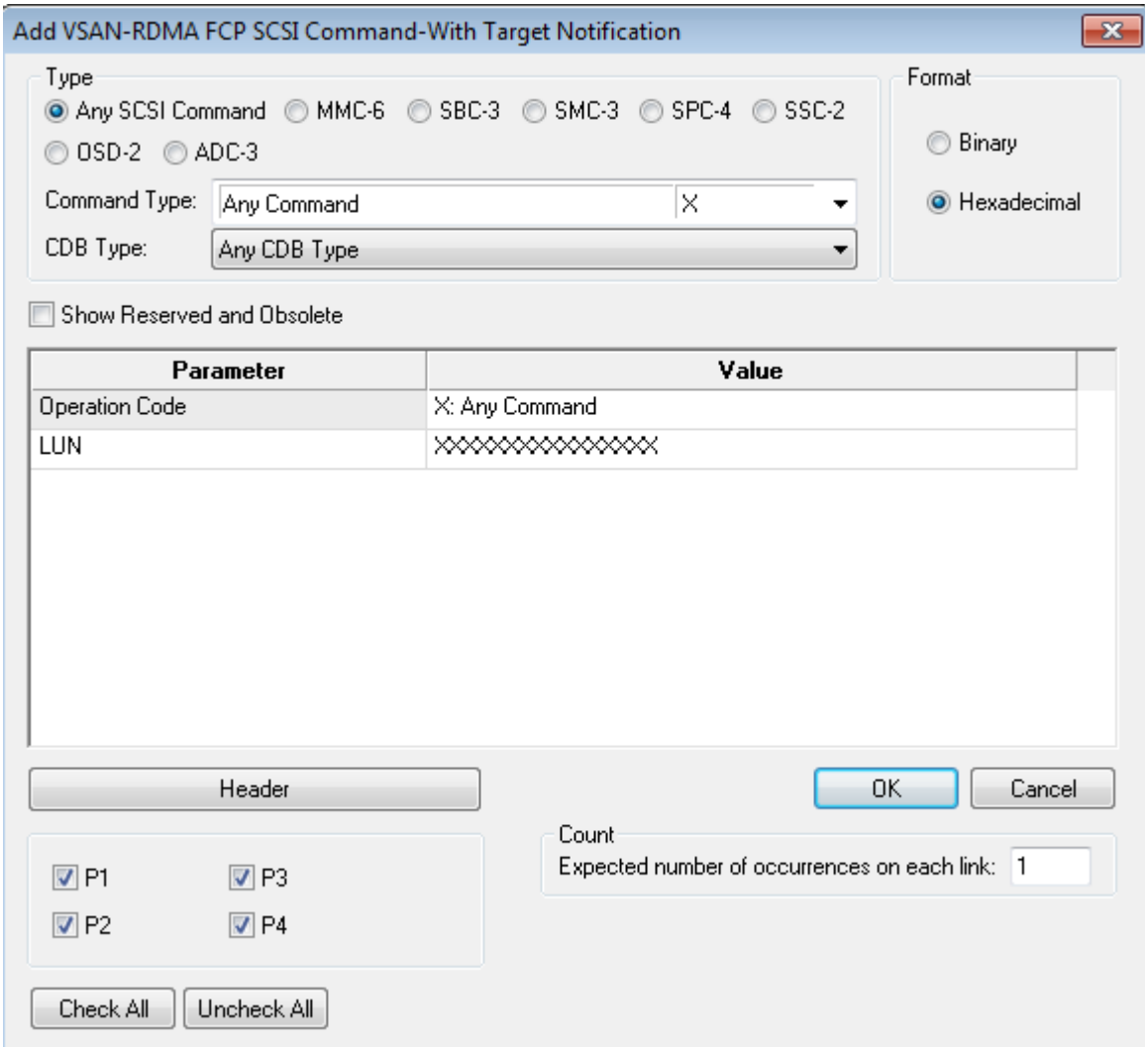


Figure 2.104: VSAN FCAE RDMA FCP- SCSI Command With Target Notification Dialog

The format can be **Binary** or **Hexadecimal**.

If you select **Any SCSI Command**, the Command Type can only be **Any Command**. Click the down arrow next to the CDB dropdown list, scroll the list to choose a CDB Type, and click **OK**. The **Any** option allows specifying any vendor-specific or other command.

If you select **MMC-6, SBC-3, SMC-3, SPC-4, SSC-2, OSD-2**, or **ADC-**3, click the down arrow next to the Command Type dropdown list, scroll the list to choose a Command Type, and click **OK**.

VSAN FCAE RDMA FCP Command Frame Information Unit With Target Notification

Double-click **VSAN FCAE RDMA FCP Command Frame Information Unit -With Target Notification** in the Pattern window to open the Add VSAN FCAE RDMA FCP Command Frame Information Unit With Target Notification dialog.

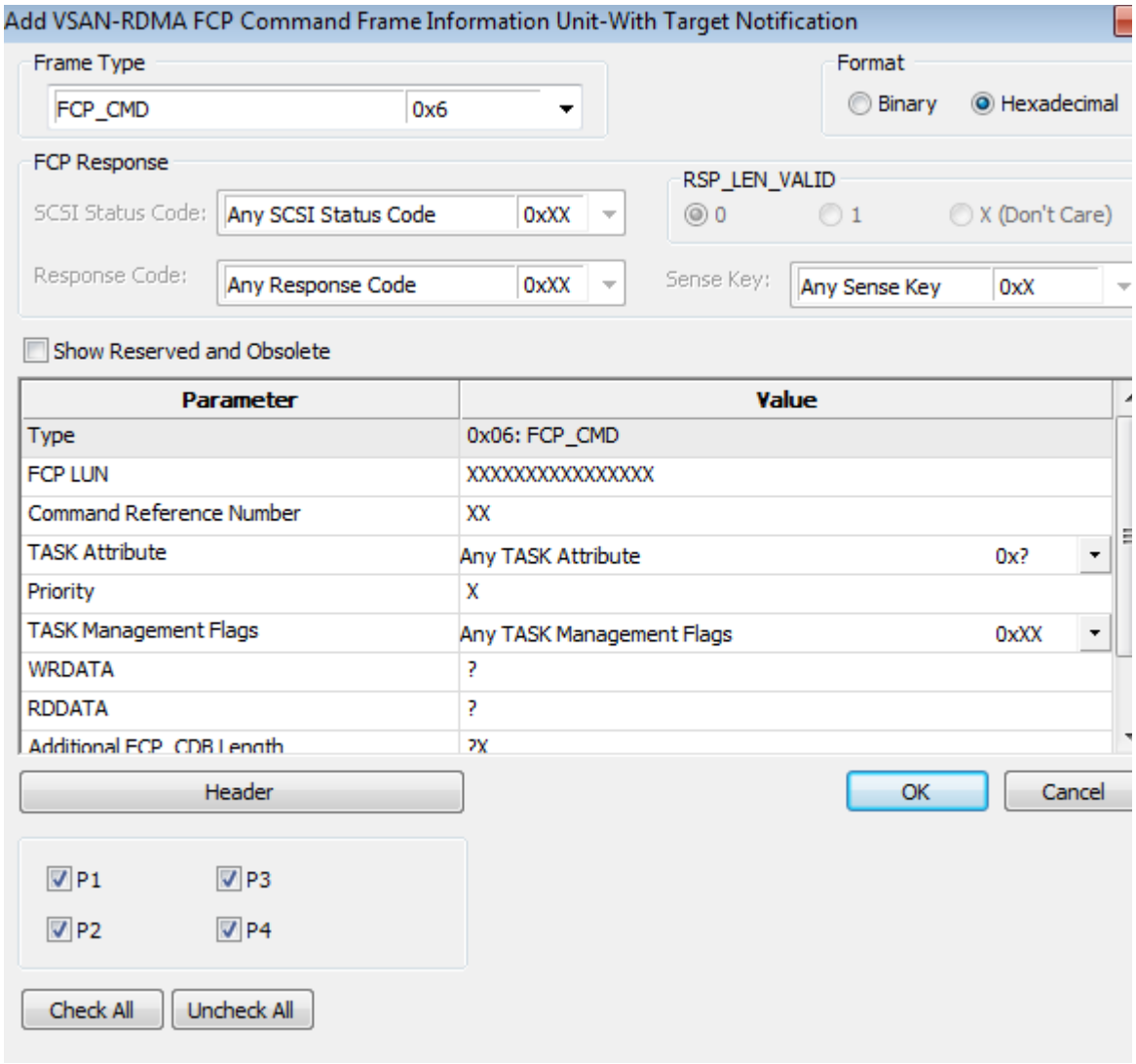


Figure 2.105: VSAN FCAE RDMA FCP Command Frame Information Unit -With Target Notification Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Frame Type**, click the dropdown list. On selecting a Frame Type the Parameters and Value of that Frame Type are displayed.

VSAN FCAE-RDMA FCP SCSI Command - Without Target Notification

Double-click **VSAN FCAE RDMA FCP SCSI Command-Without Target Notification** in the Patterns Library panel to open the Add VSAN FCAE RDMA FCP SCSI Command-Without Target Notification dialog.

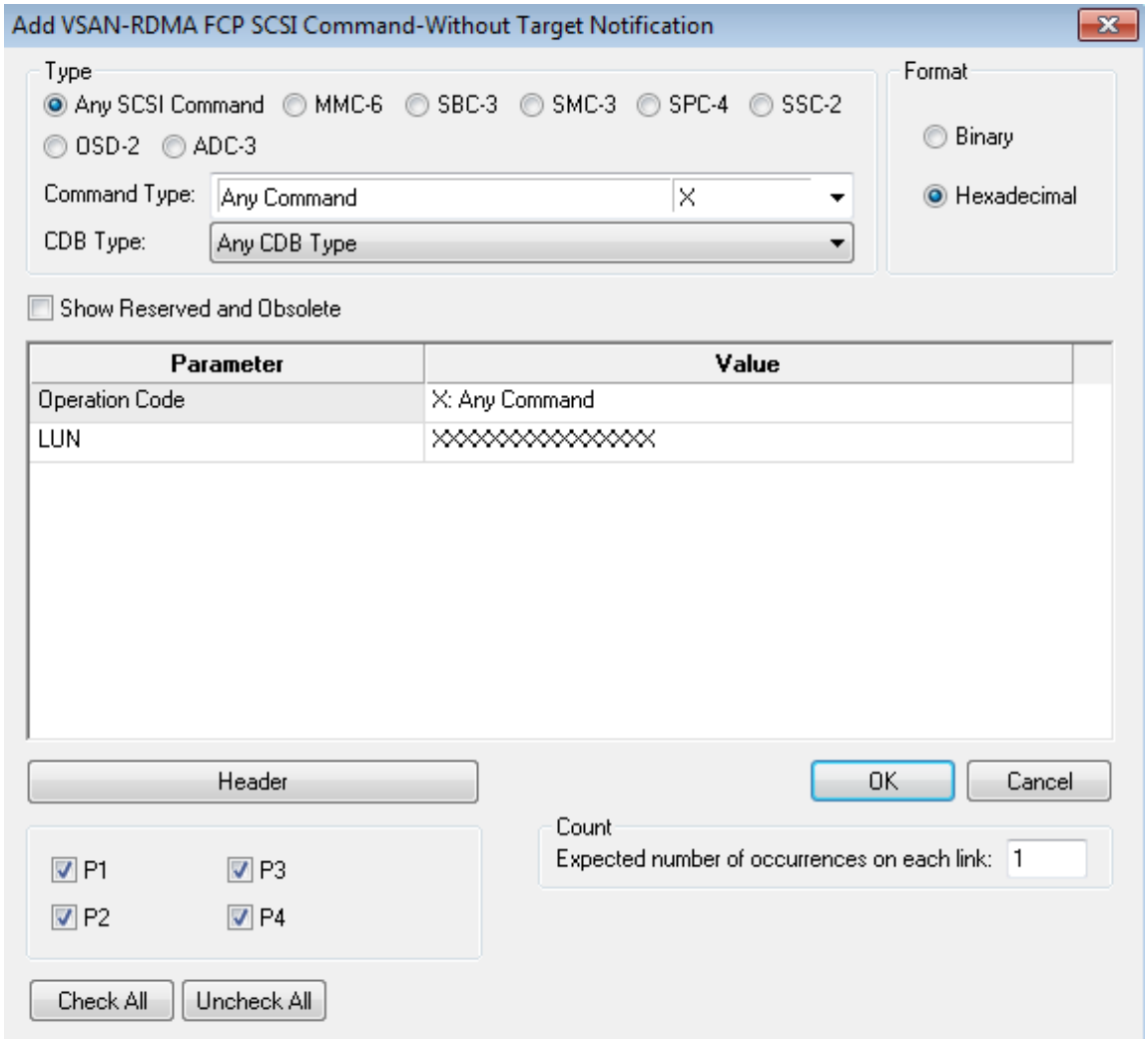


Figure 2.106: VSAN FCAE RDMA FCP SCSI Command Without Target Notification Dialog

The format can be **Binary** or **Hexadecimal**.

If you select **Any SCSI Command**, the Command Type can only be **Any Command**. Click the down arrow next to the CDB dropdown list, scroll the list to choose a CDB Type, and click **OK**. The **Any** option allows specifying any vendor-specific or other command.

If you select **MMC-6, SBC-3, SMC-3, SPC-4, SSC-2, OSD-2**, or **ADC-**3, click the down arrow next to the Command Type dropdown list, scroll the list to choose a Command Type, and click **OK**.

VSAN FCAE RDMA FCP Frame Information Unit Without Target Notification

Double-click **VSAN FCAE RDMA FCP Frame Information Unit -With Target Notification** in the Pattern window to open the Add VSAN FCAE RDMA FCP Frame Information Unit - With Target Notification dialog.

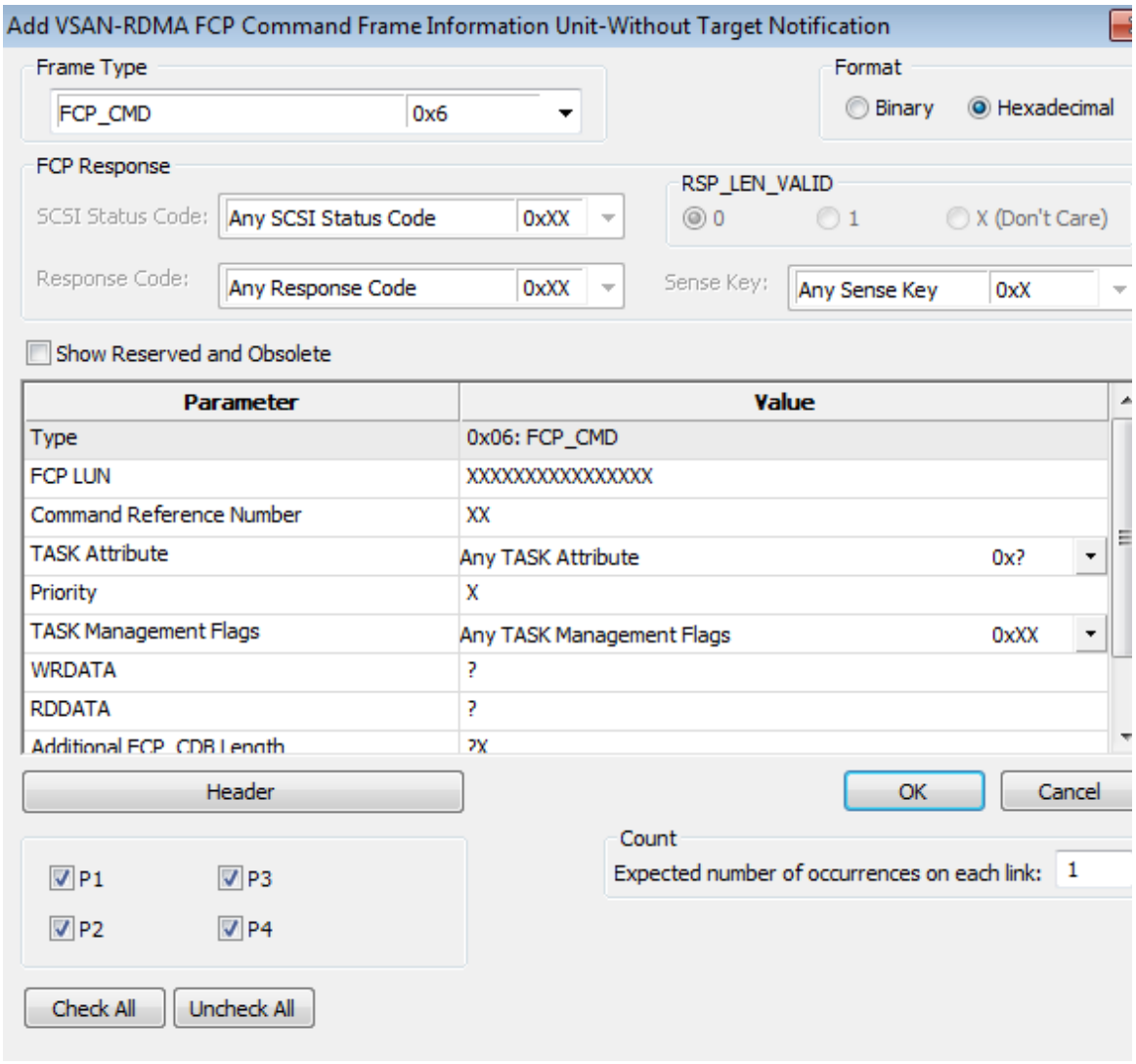


Figure 2.107: VSAN FCAE RDMA FCP Frame Information Unit Without Target Notification Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

To select a **Frame Type**, click the dropdown list. On selecting a Frame Type the Parameters and Value of that Frame Type are displayed.

VSAN-FCVI

The following patterns are available for VSAN-FCVI:

VSAN-FCVI(Any)

VSAN-FCVI(SEND_RQST)

VSAN-FCVI(WRITE_RQST)

VSAN-FCVI(READ_RQST)

VSAN-FCVI(SEND_RESP)

VSAN-FCVI(WRITE_RESP)

VSAN-FCVI(READ_RESP)

VSAN-FCVI(CONNECT_RQST)

VSAN-FCVI(DISCONNECT_RQST)

VSAN-FCVI(CONNECT_RESP1)

VSAN-FCVI(CONNECT_RESP2)

VSAN-FCVI(CONNECT_RESP3)

VSAN-FCVI(DISCONNECT_RESP)

Double-click on any of the VSAN-FCVI patterns listed above in the Patterns Library panel to open the VSAN-FCVI dialog. Select a VSAN-FCVI service from the dropdown list which has the options listed above. The format can be **Binary** or **Hexadecimal**.

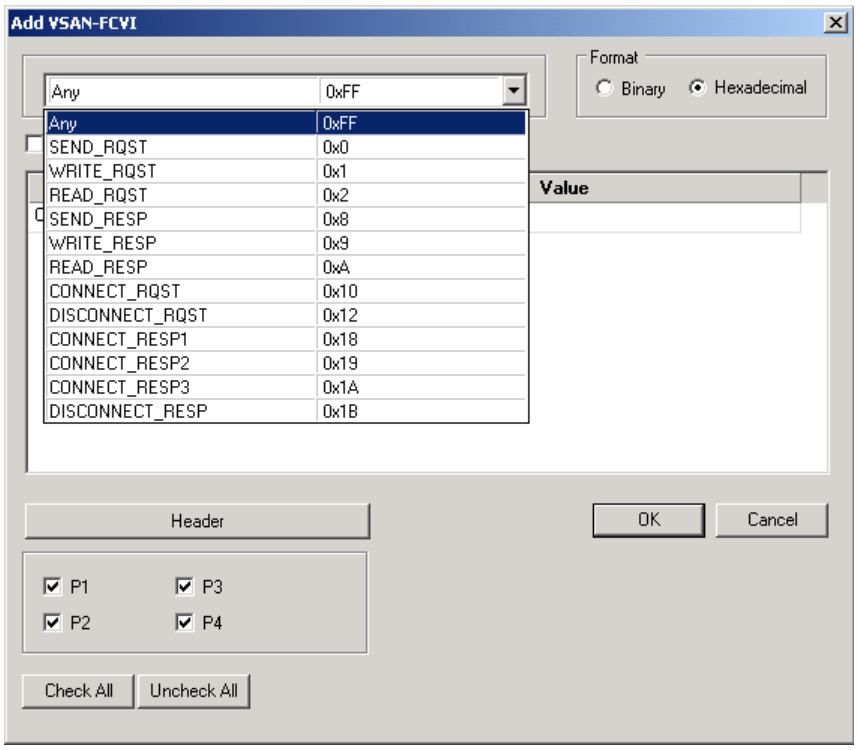


Figure 2.108: VSAN-FCVI Service Dialog

VSAN-FCAV

Two VSAN-FCAV Patterns patterns are available:

VSAN-FCAV(Simple)

VSAN-FCAV(Extended)

Double-click on any of the VSAN-FCAV patterns listed above in the Patterns Library panel to open the VSAN-FCAV dialog. Select a VSAN-FCAV service from the dropdown list which has the two options listed above. Format can be **Binary** or **Hexadecimal**.

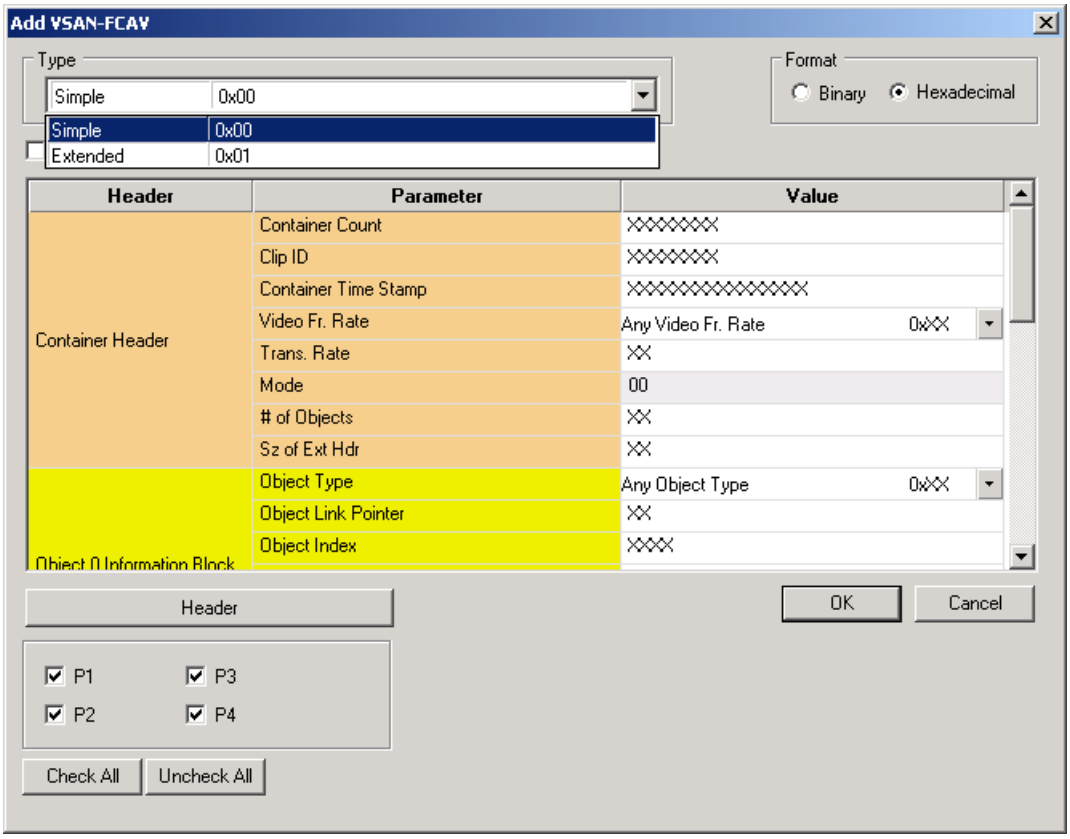


Figure 2.109: VSAN-FCAV Service Dialog

To select the value for AddVSAN- FCAV, Simple or Extended Container Header, click on the drop-down menu and select from the options listed below

- Any Video Fr. Rate
- Null
- 15
- 20
- 24
- 24*1000/1001
- 24 (Segmented frames)
- 24*1000/1001 (Segmented frames)
- 25 (PAL)
- 30

- 30*1000/1001 (29.97 NTSC)
- 50
- 60
- 60*1000/1001 (59.94 NTSC)

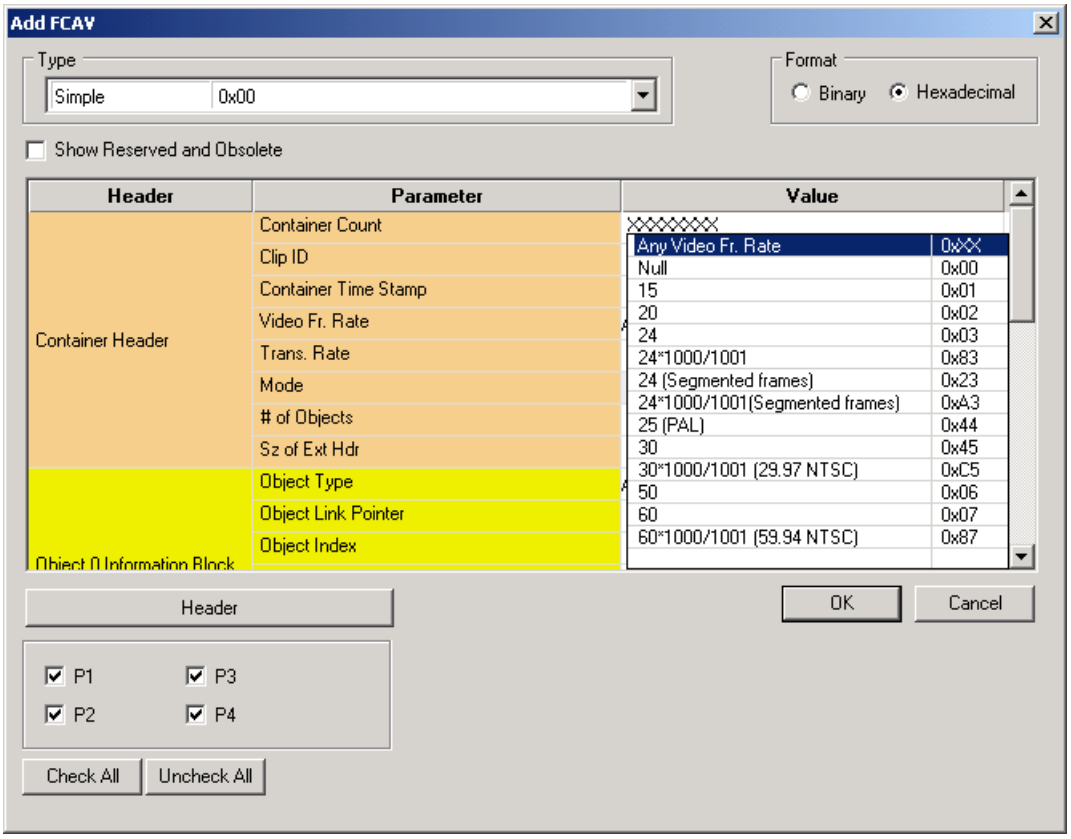


Figure 2.110: VSAN-FCAV Container Header Values Dialog

To select the value for Add VSAN-FCAV, Simple or Extended Object Information Block, click on the drop-down menu and select from the options listed below

- Any Object Type
- Video - uncompressed
- Video - compressed
- Video - reserved
- Video Program
- Video Program - reserved
- Graphics
- Graphics - reserved
- Audio - uncompressed
- Audio - compresses
- Audio - reserved
- Ancillary Data
- Full Stream - structures
- Full Stream - reserved
- Negotiated

- Vendor Specific

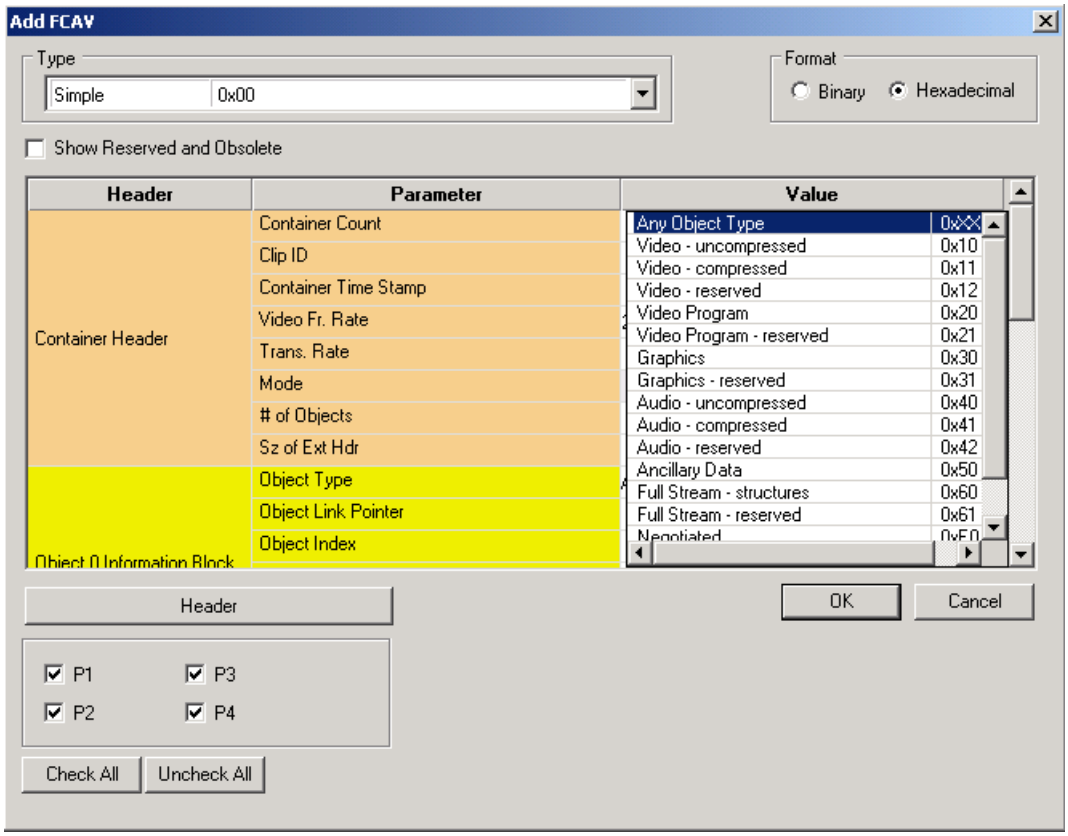


Figure 2.111: VSAN-FCAV Object Information Values Dialog

VSAN-ADVB

The VSAN ADVB patterns are identical to the ADVB patterns. See “ADVB” on page 94 for more information.

Custom Frame

Double-click **Custom Frame** in the Pattern window to open the Add Custom Frame Pattern dialog.

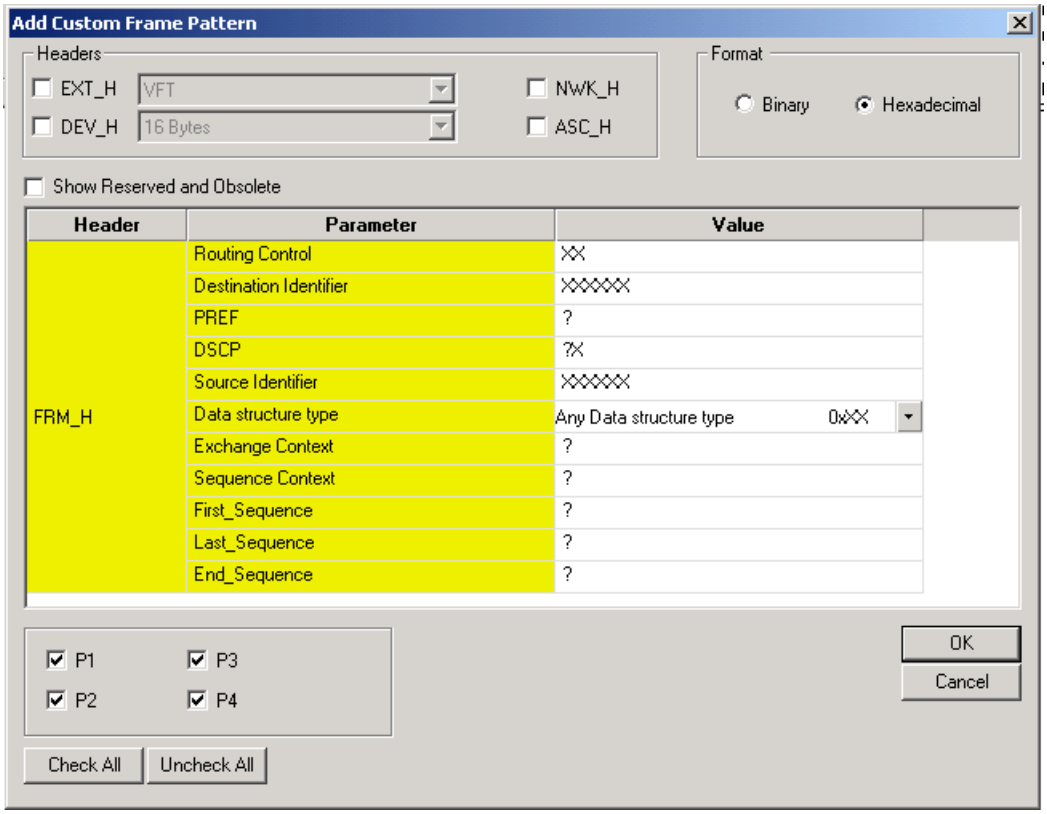


Figure 2.112: Custom Frame Pattern Dialog

The format can be **Binary** or **Hexadecimal**.

You can select a Header by checking **EXT_H, DEV_H, NWK_H,** and/or **ASC_H**. You can also select one or more headers.

If you check **EXT_H** and/or **DEV_H**, click the dropdown list to select more options.

Custom Frame-Type

The Custom Frame has an additional **Type** dropdown menu under the **Value** pane on the right of the dialog as shown in the following figure.

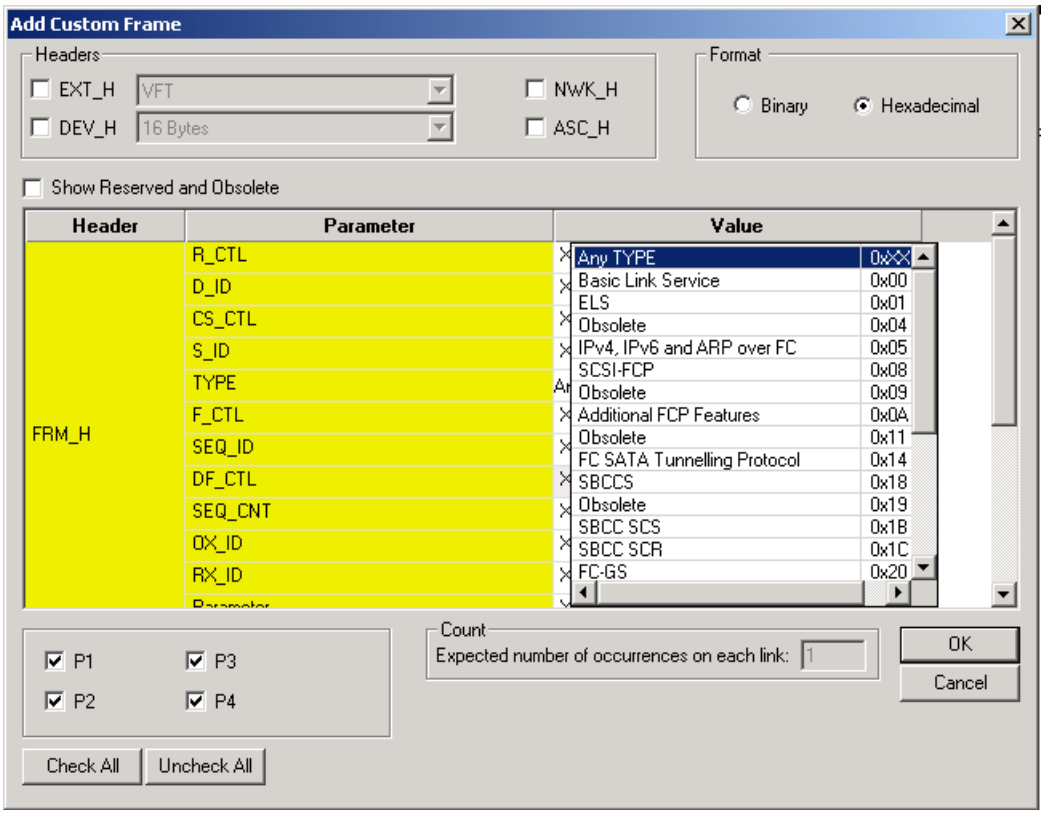


Figure 2.113: Add Custom Frame - Type Drop-down List

To select **Type** click the dropdown list which has the following options:

- Any Type
- Basic Link Service
- ELS
- Obsolete
- IPv4, IPv6 and ARP over FC
- SCSI-FCP
- Obsolete
- Additional FCP Features
- Obsolete
- SBCCS
- Obsolete
- SBCC SCS
- SBCC SCR
- FC-GS
- FC-SW
- Obsolete
- Intr-Fab Rtr Inter. Link Srvs
- HIPPI-FP

- FC-AE 1553
- FC-ASM
- FC-VI
- FC-AV Container
- ARINC 818
- Generic FC Feat
- RNID Gen. Top. Dis. Page

Protocol Errors

Double-click **Protocol Errors** to open the Add Protocol Error Pattern selection dialog.

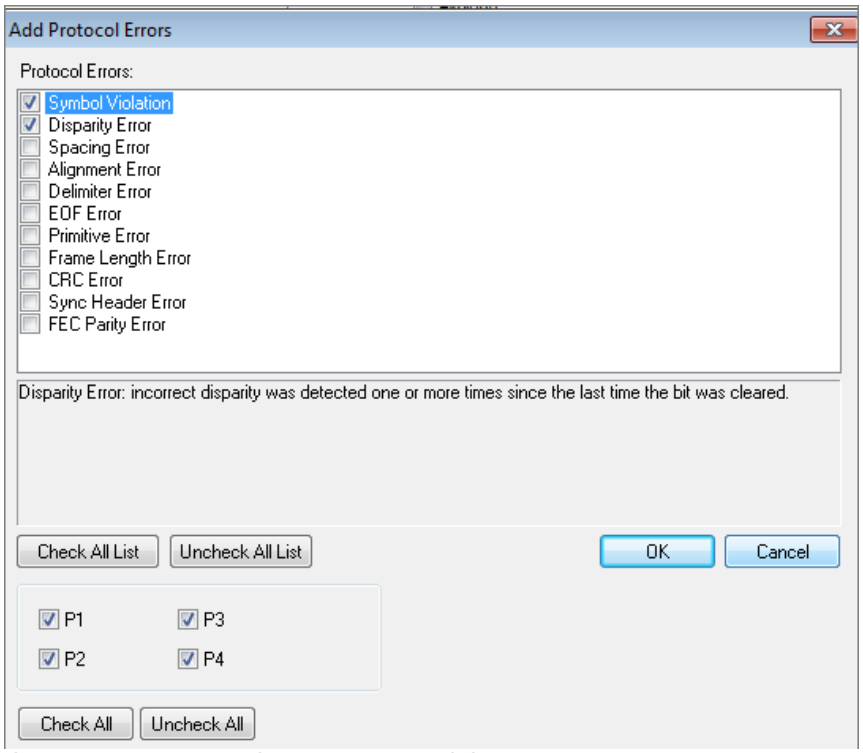


Figure 2.114: Protocol Error Pattern Dialog

Check protocol error(s) and then click **OK**.

Trigger Setup

The **Trigger** tab in the analysis project dialog allows you to specify when the analyzer completes a data capture. Three trigger modes are available: The default **Snapshot, Manual Trigger,** and **Pattern/Event Trigger.**

When data capture starts with **Don't care (Snapshot)** selected, the analyzer triggers on the first data pattern on the bus.

Starting a data capture with **Pattern** selected triggers when specific pattern(s) are detected in the captured data stream. The following three ways can trigger the analyzer with **Pattern** selected:

- Trigger on any pattern (Any Trigger Mode)

- External Trigger
- Trigger on a sequence of patterns (Sequential Trigger Mode)

Snapshot Mode

To trigger immediately on any pattern, check the **Snapshot** button.

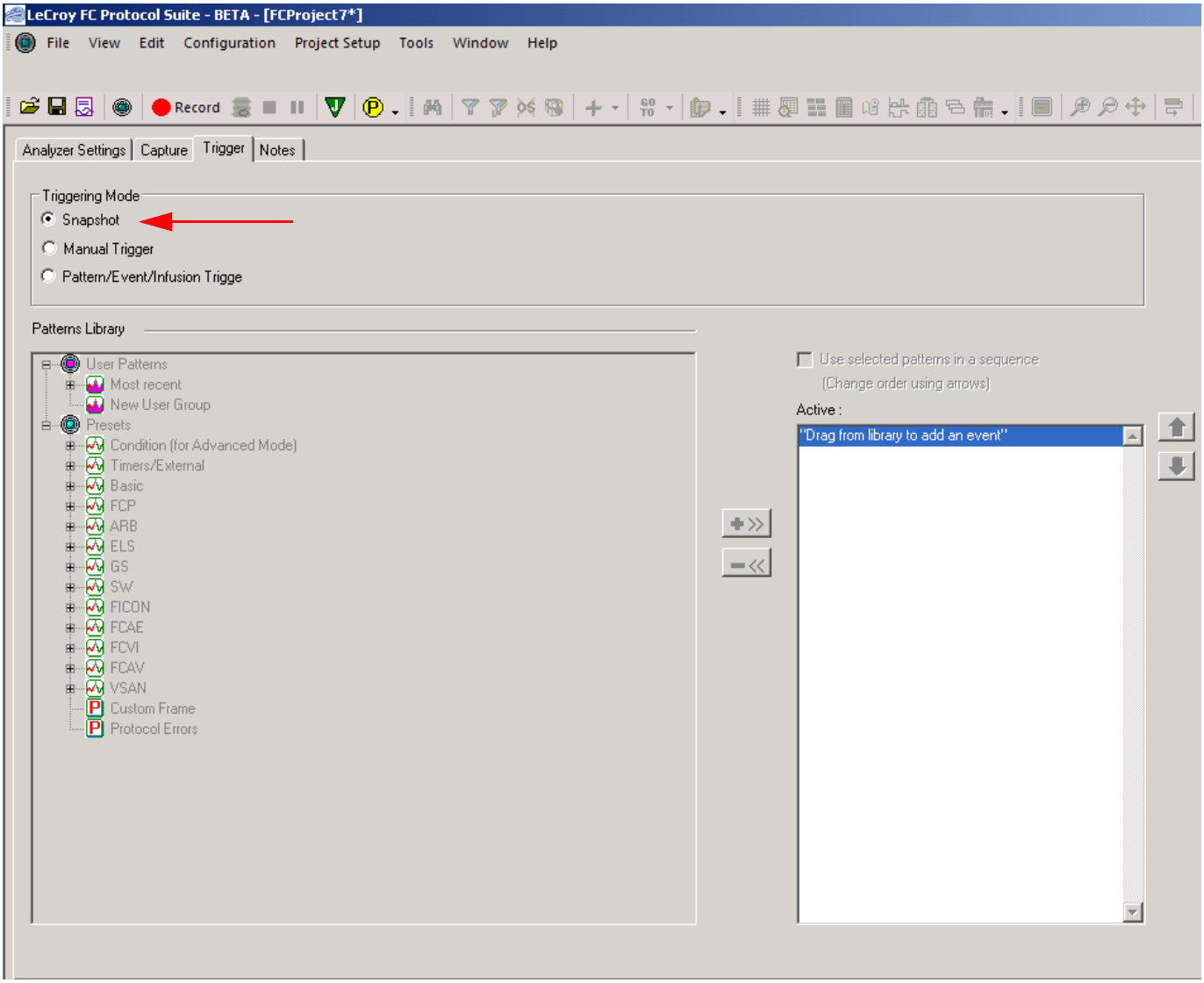


Figure 2.115: Default Trigger Snapshot Mode Selected

Manual Trigger Mode

In the **Manual Trigger** mode, the analyzer captures bus traffic continually from when you use the Manual Trigger until you click the **Stop Hardware** button (on the analyzer toolbar), which triggers the analyzer. To perform a manual trigger, check the **Manual Trigger** button.

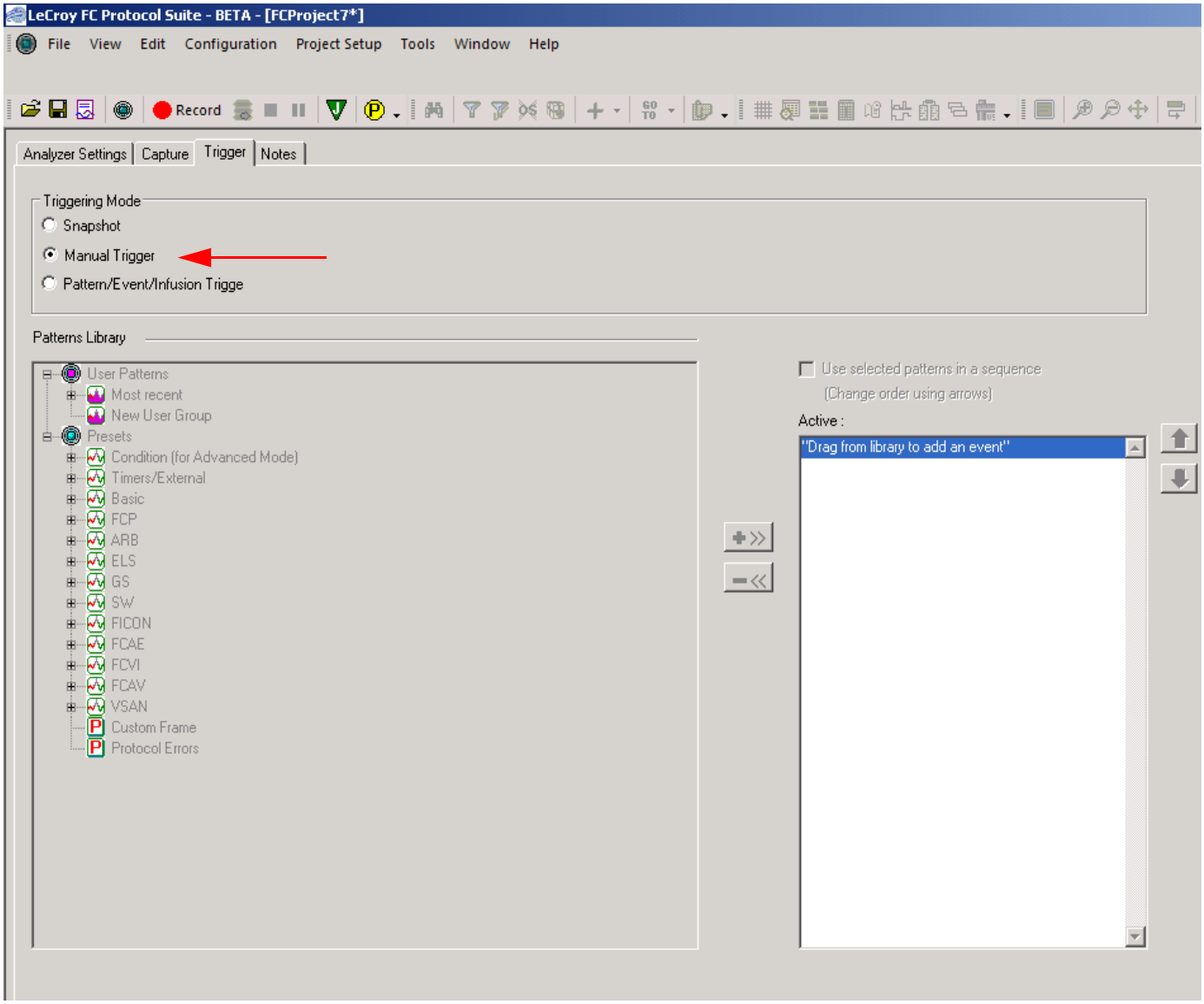


Figure 2.116: Manual Trigger Mode Selected

Pattern/Event/Infusion Trigger Mode

In Pattern/Event Trigger mode, the Analyzer triggers whenever any of the patterns selected for triggering occurs (an OR condition). In Pattern/Event/InFusion mode, the analyzer can be triggered by an InFusion event that has the Analyzer Trigger action (see Analyzer Trigger in Table 4.4 on page 281). The procedure for selecting trigger parameters is identical to that for selecting capture parameters. All items selected for triggering appear in the Project Overview pane.

To define patterns for triggering, check the **Pattern** button in the Trigger dialog.

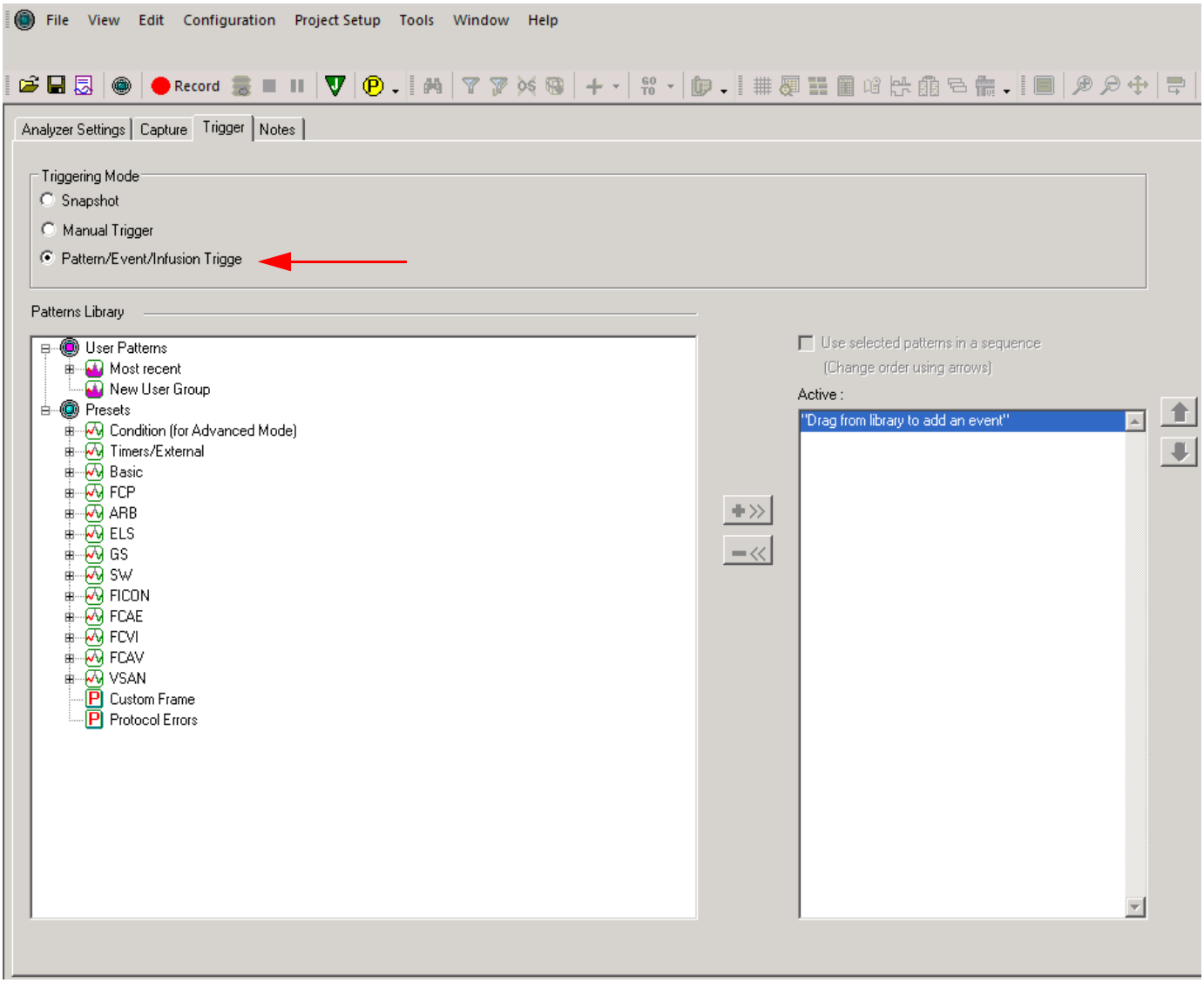


Figure 2.117: Select Patterns for Trigger

The **Patterns Library** window displays the following trigger pattern categories (for details on each of the trigger pattern refer to “Defining Patterns” on page 47):

- Timers/External
  - Timer
  - Timeout
  - External Trigger

- Basic
  - Connect/Disconnect
  - Symbol
  - Ordered Set
  - Basic Link Service
  - Link Control Frame
  - Symbol 16G
  - Training Sequence

Symbol 16G

Double-click **Symbol 16G** in the Pattern Library to set the trigger on Symbol 16G.

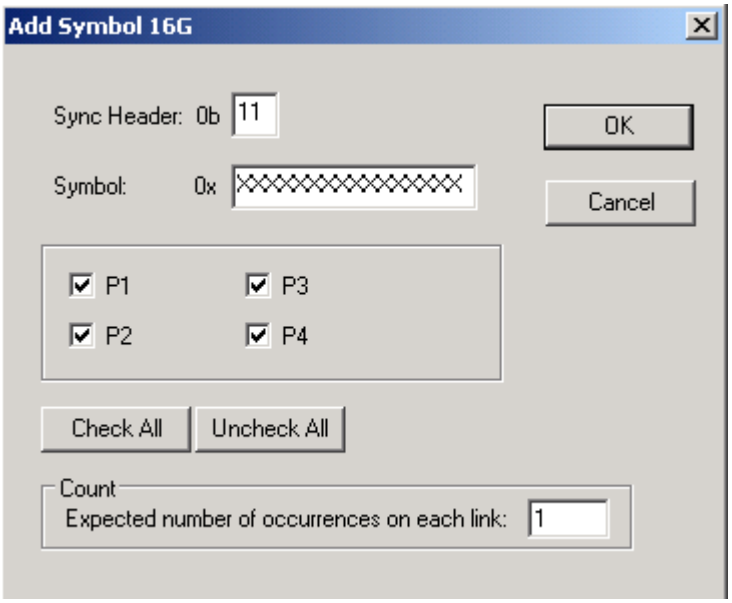


Figure 2.118: Add Symbol 16G Dialog

The **Sync Header** value and the **Symbol** pattern can be entered.

The Ports can be selected and you can enter the **Expected number of occurrences on each link** in the **Count** field.

Training Sequence

Double-click **Training Sequence** in the Pattern Library to set the trigger on Training Sequence.

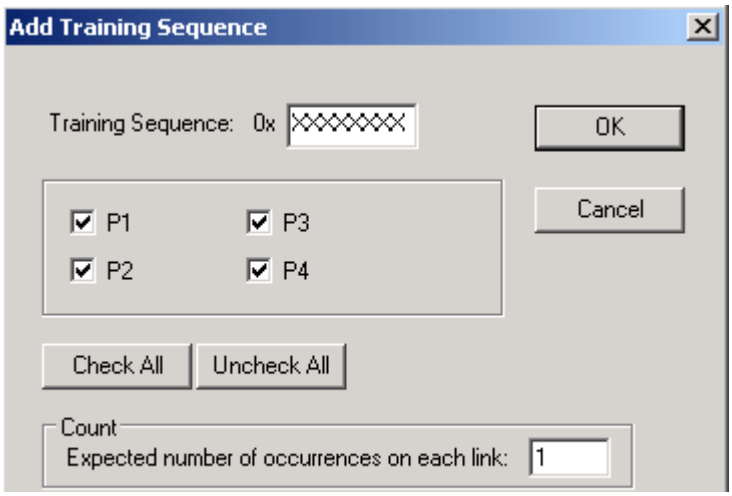


Figure 2.119: Add Training Sequence Dialog

The **Training Sequence** pattern can be entered.

The Ports can be selected and you can enter the **Expected number of occurrences on each link** in the **Count** field.

- FCP
  - FCP SCSI Command
  - FCP Frame Information Unit
  - SCSI Command Status
  - FCP Task Management
- ARB/ELS
  - ARB Loop Initialization
  - Extended Link Service - Request
  - Extended Link Service - Request, Reply
  - Extended Link Service - Reply
- GS
  - Generic Link Service - Request
  - Generic Link Service - Request, Reply
  - Generic Link Service - Reply
- SW
  - Switch Internal Link Service - Request
  - Switch Internal Link Service - Request, Reply
  - Switch Internal Link Service - Reply
- FICON
  - FICON (Any Data Information Block Type)
  - FICON (Data)
  - FICON (Command)
  - FICON (Status)
  - FICON (Control)

- FICON (Command-Data)
- FICON (Link-Control)

- FCAE
  - FCAE-ASM
  - FCAE-1553 (Any)
  - FCAE-1553 (Data)
  - FCAE-1553 (Command)
  - FCAE-1553 (Status)
  - FCAE-RDMA
    - FCAE RDMA FCP SCSI Command-With Target Notification
    - FCAE RDMA FCP Command Frame Information Unit -With Target Notification
    - FCAE RDMA FCP SCSI Command-Without Target Notification
    - FCAE RDMA FCP Command Frame Information Unit -Without Target Notification
- FCVI
  - FCVI (Any)
  - FCVI (SEND_RQST)
  - FCVI (WRITE_RQST)
  - FCVI (READ_RQST)
  - FCVI (SEND_RESP)
  - FCVI (WRITE_RESP)
  - FCVI (READ_RESP)
  - FCVI (CONNECT_RQST)
  - FCVI (DISCONNECT_RQST)
  - FCVI (CONNECT_RESP1)
  - FCVI (CONNECT_RESP2)
  - FCVI (CONNECT_RESP3)
  - FCVI (DISCONNECT_RESP)
- FCAV
  - FCAV (Simple)
  - FCVI (Extended)
- ADVB
  - ADVB(Object0)
  - ADVB(Object2/3)
- VSAN
  - Basic
    - VSAN-Basic Link Service
    - VSAN-Link Control Frame
  - FCP
    - VSAN-FCP SCSI Command
    - VSAN-FCP Frame Information Unit
    - VSAN-SCSI Command Status
    - VSAN-FCP Task Management
  - ARB
    - VSAN-ARB Loop Initialization
  - ELS
    - VSAN-Extended Link Service-Request

- VSAN-Extended Link Service-Request, Reply
- VSAN-Extended Link Service-Reply

- GS
  - VSAN-Generic Link Service-Request
  - VSAN-Generic Link Service-Request, Reply
  - VSAN-Generic Link Service-Reply
- SW
  - VSAN-Switch Internal Link-Request
  - VSAN-Switch Internal Link-Request, Reply
  - VSAN-Switch Internal Link-Reply
- VSAN-FICON
  - VSAN-FICON (Any Data Information Block Type)
  - VSAN-FICON (Data)
  - VSAN-FICON (Command)
  - VSAN-FICON (Status)
  - VSAN-FICON (Control)
  - VSAN-FICON (Command-Data)
  - VSAN-FICON (Link-Control)
- VSAN-FCAE
  - VSAN-FCAE-ASM
  - VSAN-FCAE-1553 (Any)
  - VSAN-FCAE-1553 (Data)
  - VSAN-FCAE-1553 (Command)
  - VSAN-FCAE-1553 (Status)
- VSAN FCAE-RDMA
  - VSAN RDMA FCP SCSI Command-With Target Notification
  - VSAN RDMA FCP Command Frame Information Unit -With Target Notification
  - VSAN RDMA FCP SCSI Command-Without Target Notification
  - VSAN RDMA FCP Command Frame Information Unit -Without Target Notification
- VSAN-FCVI
  - VSAN-FCVI (Any)
  - VSAN-FCVI (SEND_RQST)
  - VSAN-FCVI (WRITE_RQST)
  - VSAN-FCVI (READ_RQST)
  - VSAN-FCVI (SEND_RESP)
  - VSAN-FCVI (WRITE_RESP)
  - VSAN-FCVI (READ_RESP)
  - VSAN-FCVI (CONNECT_RQST)
  - VSAN-FCVI (DISCONNECT_RQST)
  - VSAN-FCVI (CONNECT_RESP1)
  - VSAN-FCVI (CONNECT_RESP2)
  - VSAN-FCVI (CONNECT_RESP3)
  - VSAN-FCVI (DISCONNECT_RESP)
- VSAN-FCAV
  - VSAN-FCAV (Simple)
  - VSAN-FCVI (Extended)

- VSAN-ADVB
  - ADVB(Object0)
  - ADVB(Object2/3)
- Custom Frame
- Protocol Errors

Choosing a Parameter

Either highlight the category and click the +>> button, or double-click the category, to open a corresponding definition dialog. Click on the Okay button to move the pattern to the Active pane.

To remove an item, highlight it in the Project Tree, then click the **-<<** button.

Timers/External

Selecting a timer for a trigger in the **Any Trigger Mode** limits the time that the analyzer looks for selected triggering conditions before triggering. The timer activates when the Project runs. If none of the selected triggering conditions occurs during the timer's active time, the Analyzer triggers at the end of the time set for the timer.

Timer

You can set a timer independently of any other trigger selection, to cause an unconditional trigger after a set time.

Double-click **Timer** in the Pattern window to open the Add Timer Pattern dialog.

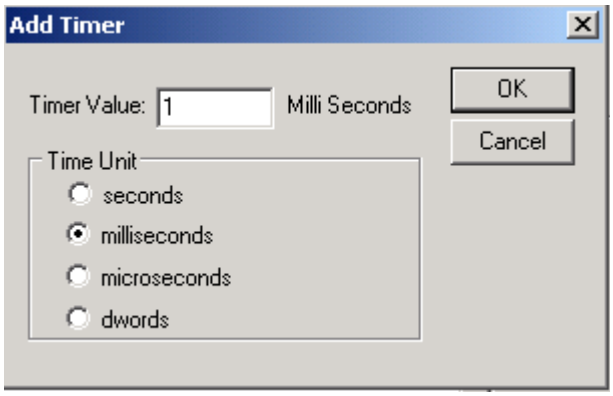


Figure 2.120: Add Timer Pattern Dialog

Check a Time Unit, enter the Timer Value, and click OK.

Note: The timer and timeout resolution is limited to one DWORD. The minimum value is 12-13 DWORD.

Timeout

Selecting **Timeout** for the pattern opens the Add Timeout Pattern dialog (see Figure 2.121 on page 158).

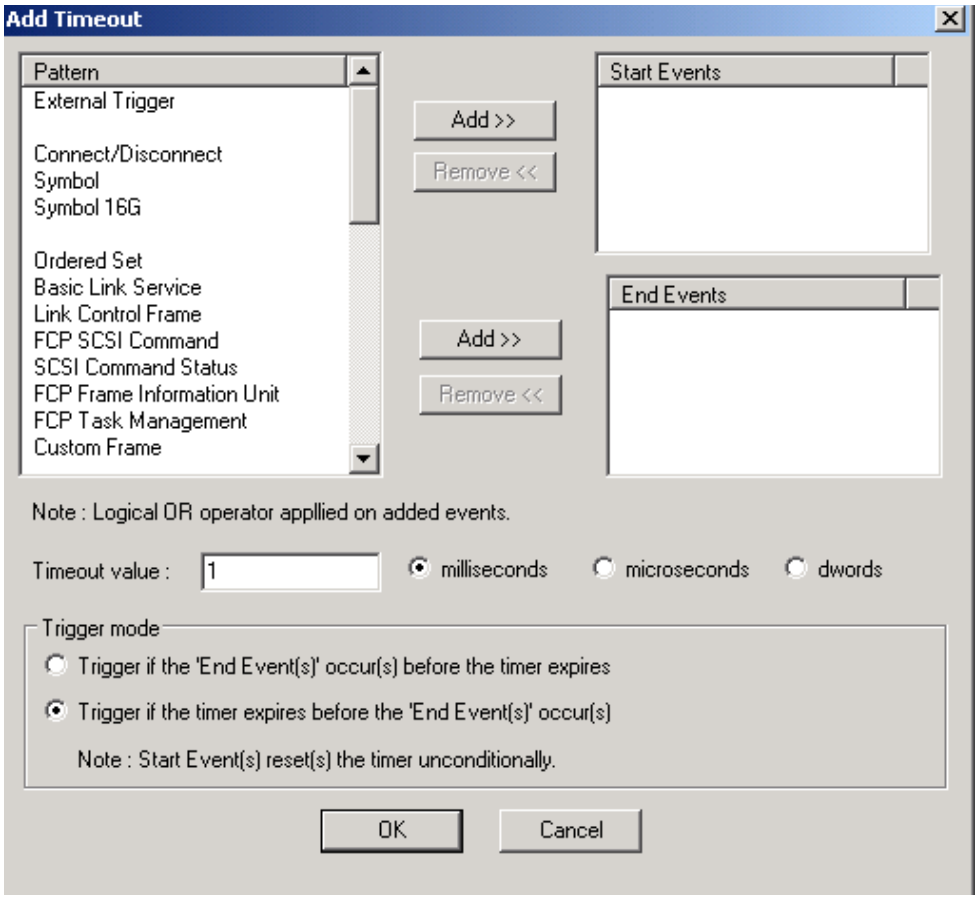


Figure 2.121: Add Timeout Pattern Dialog

Select a pattern for Start Events or End Events, enter a Timeout value, select units, and then select Trigger Mode:

- Trigger If the ‘End Event(s)’ occur(s) before the timer expires
- Trigger if the timer expires before ‘End Event(s)’ occur(s)

Note: You cannot select a Timeout pattern if you select any other pattern as the trigger condition.

External Trigger Pattern

You can trigger on an external trigger. To set up the trigger, click the **External Trigger** pattern. In order to select an External Trigger refer to the “External Trig Setting” on page 255.

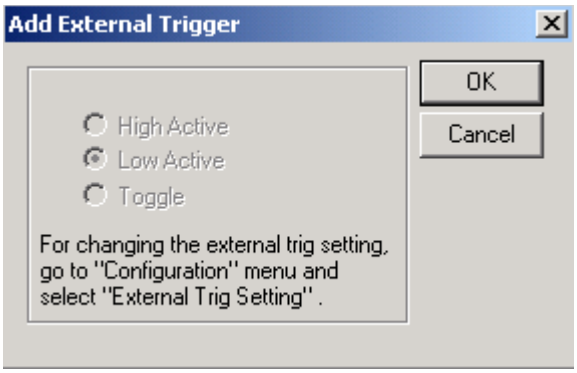


Figure 2.122: Add External Trigger Pattern Dialog

Basic Patterns

Connect/Disconnect

See “Basic Patterns” on page 48.

Symbol

Double-click **Symbol** in the Pattern window to open the Add Symbol Pattern dialog.

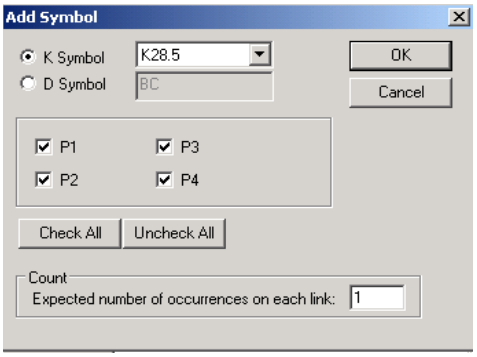


Figure 2.123: Add Symbol Pattern Dialog

Choose a symbol type by checking either the K Symbol or D Symbol option.

If you choose the K symbol, click the down arrow in the Symbol dropdown list, choose a symbol on which to trigger, and click **OK**.

The D Symbol choice does not have a down arrow.

Count is the expected number of occurrences on each link. Default is 1.

Ordered Set

See “Ordered Set” on page 49 for more information.

Basic Link Service

See “Basic Link Service” on page 50 for more information.

Link Control Frame

See “Link Control Frame” on page 51.

Symbol 16G

See “Symbol 16G” on page 153.

Training Sequence

See “Training Sequence” on page 154.

FCP Patterns

FCP SCSI Command

See “FCP Patterns” on page 52 for more information.

FCP Frame Information Unit

See “FCP Frame Information Unit” on page 53 for more information.

SCSI Command Status

See “SCSI Command Status” on page 54 for more information.

FCP Task Management

See “FCP Task Management” on page 55 for more information.

ARB

ARB Loop Initialization

See “ARB Loop Initialization” on page 56 for more information.

ELS

Extended Link Service - Request

See “Extended Link Service - Request” on page 57 for more information.

Extended Link Service - Request, Reply

See “Extended Link Service - Request, Reply” on page 58 for more information.

Extended Link Service - Reply

See “Extended Link Service - Reply” on page 59 for more information.

GS

Generic Link Service - Request

See “Generic Link Service - Request” on page 60 for more information.

Generic Link Service - Request, Reply

See “Generic Link Service - Request, Reply” on page 61 for more information.

Generic Link Service - Reply

See “Generic Link Service - Reply” on page 62 for more information.

SW

Switch Internal Link Service - Request

See “Switch Internal Link Service - Request” on page 63 for more information.

Switch Internal Link Service - Request, Reply

See “Switch Internal Link Service - Request, Reply” on page 64 for more information.

Switch Internal Link Service - Reply

See “Switch Internal Link Service - Reply” on page 65 for more information.

FICON

Any Data Information Block Type

See “Any Data Information Block Type” on page 66 for more information.

FICON Data

See “Add FICON Data” on page 67 for more information.

FICON Command

See “Add FICON Command” on page 68 for more information.

FICON Status

See “Add FICON Status” on page 70 for more information.

FICON Control

See “Add FICON Control” on page 73 for more information.

FICON Command Data

See “Add FICON Command-Data” on page 75 for more information.

FICON Link Control

See “Add FICON Link-Control” on page 77 for more information.

FCAE

FCAE-ASM

See “FCAE-ASM” on page 79 for more information.

FCAE-1553

FCAE-1553 Any

See “FCAE-1553 Any” on page 80 for more information.

FCAE-1553 Data

See “Add FCAE-1553 Data” on page 81 for more information.

FCAE-1553 Command

See “Add FCAE-1553 Command” on page 82 for more information.

FCAE-1553 Status

See “Add FCAE-1553 Status” on page 85 for more information.

FCAE-RDMA

FCAE-RDMA FCP SCSI Command - With Target Notification

See “FCAE-FCP SCSI Command - RDMA With Target Notification” on page 86 for more information.

FCAE RDMA FCP Command Frame Information Unit With Target Notification

See “FCAE RDMA FCP Command Frame Information Unit With Target Notification” on page 87 for more information.

FCAE-RDMA FCP SCSI Command - Without Target Notification

See “FCAE-RDMA FCP SCSI Command Without Target Notification” on page 88 for more information.

FCAE RDMA FCP Frame Information Unit Without Target Notification

See “FCAE RDMA FCP Frame Information Unit Without Target Notification” on page 89 for more information.

FCVI

FCVI(Any)

See “FCVI(Any)” on page 90 for more information.

FCVI(SEND_RQST)

See “FCVI(SEND_RQST)” on page 90 for more information.

FCVI(WRITE_RQST)

See “FCVI(WRITE_RQST)” on page 90 for more information.

FCVI(READ_RQST)

See “FCVI(READ_RQST)” on page 90 for more information.

FCVI(SEND_RESP)

See “FCVI(SEND_RESP)” on page 90 for more information.

FCVI(WRITE_RESP)

See “FCVI(WRITE_RESP)” on page 90 for more information.

FCVI(READ_RESP)

See “FCVI(READ_RESP)” on page 90 for more information.

FCVI(CONNECT_RQST)

See “FCVI(CONNECT_RQST)” on page 90 for more information.

FCVI(DISCONNECT_RQST)

See “FCVI(DISCONNECT_RQST)” on page 90 for more information.

FCVI(CONNECT_RESP1)

See “FCVI(CONNECT_RESP1)” on page 90 for more information.

FCVI(CONNECT_RESP2)

See “FCVI(CONNECT_RESP2)” on page 90 for more information.

FCVI(CONNECT_RESP3)

See “FCVI(CONNECT_RESP3)” on page 90 for more information.

FCVI(DISCONNECT_RESP)

See “FCVI(DISCONNECT_RESP)” on page 90 for more information.

FCAV

FCAV(SIMPLE)

See “FCAV(Simple)” on page 91 for more information.

FCAV(EXTENDED)

See “FCAV(Extended)” on page 91 for more information.

ADVB

ADVB(Object0)

See “ADVB(Object0)” on page 94 for more information.

ADVB(Object2/3)

See “ADVB(Object2/3)” on page 101 for more information.

VSAN Basic

VSAN Basic Link Service

See “VSAN-Basic Link Service” on page 102 for more information.

VSAN Link Control Frame

See “VSAN-Link Control Frame” on page 103 for more information.

VSAN-FCP

VSAN-FCP SCSI Command

See “Add VSAN-FCP SCSI Command” on page 104 for more information.

VSAN-FCP Frame Information Unit

See “Add VSAN-FCP Frame Information Unit” on page 105 for more information.

VSAN-FCP SCSI Command Status

See "Add VSAN-SCSI Command Status" on page 106 for more information.

VSAN-FCP Task management

See "Add VSAN FCP Task Management" on page 107 for more information.

VSAN-ARB

VSAN-ARB Loop Initialization

See "Add VSAN-ARB Loop Initialization" on page 109 for more information.

VSAN-ELS

VSAN-Extended Link Service - Request

See "VSAN-Extended Link Service - Request" on page 110 for more information.

VSAN-Extended Link Service - Request, Reply

See "VSAN-Extended Link Service - Request, Reply" on page 111 for more information.

VSAN-Extended Link Service - Reply

See "VSAN-Extended Link Service - Reply" on page 112 for more information.

VSAN-GS

VSAN-Generic Link Service - Request

See "VSAN-Generic Link Service - Request" on page 113 for more information.

VSAN-Generic Link Service - Request, Reply

See "VSAN-Generic Link Service - Request, Reply" on page 114 for more information.

VSAN-Generic Link Service - Reply

See "VSAN-Generic Link Service - Reply" on page 115 for more information.

VSAN-SW

VSAN-Switch Internal Link - Request

See "VSAN-Switch Internal Link Service - Request" on page 116 for more information.

VSAN-Switch Internal - Request, Reply

See "VSAN-Switch Internal Link Service - Request, Reply" on page 117 for more information.

VSAN-Switch Internal - Reply

See "VSAN-Switch Internal Link Service - Reply" on page 118 for more information.

VSAN-FICON

VSAN-FICON Any Data Information Block Type

See "VSAN-FICON (Any Data Information Block Type)" on page 119 for more information.

VSAN-FICON Data

See “Add VSAN-FICON Data” on page 120 for more information.

VSAN-FICON Command

See “Add VSAN-FICON Command” on page 121 for more information.

VSAN-FICON Status

See “Add VSAN-FICON Status” on page 123 for more information.

VSAN-FICON Control

See “Add VSAN-FICON Control” on page 126 for more information.

VSAN-FICON Command Data

See “Add VSAN-FICON Command-Data” on page 128 for more information.

VSAN-FICON Link Control

See “Add VSAN-FICON Link-Control” on page 130 for more information.

VSAN-FCAE-ASM

VSAN-FCAE-ASM

See “VSAN-FCAE-ASM” on page 132 for more information.

VSAN-FCAE-1553

VSAN-FCAE-1553 Any

See “VSAN-FCAE-1553 Any” on page 133 for more information.

VSAN-FCAE-1553 Data

See “Add VSAN-FCAE-1553 Data” on page 134 for more information.

VSAN-FCAE-1553 Command

See “VSAN-FCAE-1553 Command” on page 165 for more information.

VSAN-FCAE-1553 Status

See “Add VSAN-FCAE-1553 Status” on page 138 for more information.

VSAN-FCAE-RDMA

VSAN FCAE-RDMA FCP SCSI Command - With Target Notification

See “VSAN FCAE-RDMA FCP SCSI Command - With Target Notification” on page 139 for more information.

VSAN FCAE-RDMA FCP SCSI Command - With Target Notification

See “VSAN FCAE RDMA FCP Command Frame Information Unit With Target Notification” on page 140 for more information.

VSAN FCAE-RDMA FCP SCSI Command - Without Target Notification

See "VSAN FCAE-RDMA FCP SCSI Command - Without Target Notification" on page 141 for more information.

VSAN FCAE RDMA FCP Frame Information Unit Without Target Notification

See "VSAN FCAE RDMA FCP Frame Information Unit Without Target Notification" on page 142 for more information.

VSAN-FCVI

FCVI(Any)

See "VSAN-FCVI(Any)" on page 143 for more information.

FCVI(SEND_RQST)

See "VSAN-FCVI(SEND_RQST)" on page 143 for more information.

FCVI(WRITE_RQST)

See "VSAN-FCVI(WRITE_RQST)" on page 143 for more information.

FCVI(READ_RQST)

See "VSAN-FCVI(READ_RQST)" on page 143 for more information.

FCVI(SEND_RESP)

See "VSAN-FCVI(SEND_RESP)" on page 143 for more information.

FCVI(WRITE_RESP)

See "VSAN-FCVI(WRITE_RESP)" on page 143 for more information.

FCVI(READ_RESP)

See "VSAN-FCVI(READ_RESP)" on page 143 for more information.

FCVI(CONNECT_RQST)

See "VSAN-FCVI(CONNECT_RQST)" on page 143 for more information.

FCVI(DISCONNECT_RQST)

See "VSAN-FCVI(DISCONNECT_RQST)" on page 143 for more information.

FCVI(CONNECT_RESP1)

See "VSAN-FCVI(CONNECT_RESP1)" on page 143 for more information.

FCVI(CONNECT_RESP2)

See "VSAN-FCVI(CONNECT_RESP2)" on page 143 for more information.

FCVI(CONNECT_RESP3)

See "VSAN-FCVI(CONNECT_RESP3)" on page 143 for more information.

FCVI(DISCONNECT_RESP)

See "VSAN-FCVI(DISCONNECT_RESP)" on page 143 for more information.

VSAN-FCAV

VSAN-FCAV(SIMPLE)

See “VSAN-FCAV(Simple)” on page 144 for more information.

VSAN-FCAV(EXTENDED)

See “VSAN-FCAV(Extended)” on page 144 for more information.

VSAN-ADVB

ADVB(Object0)

See “ADVB(Object0)” on page 94 for more information.

ADVB(Object2/3)

See “ADVB(Object2/3)” on page 101 for more information.

Custom Frame

See “Custom Frame” on page 147 for more information.

Protocol Errors

See “Protocol Errors” on page 149 for more information.

Sequential Trigger Mode

In Sequential Trigger mode, triggering occurs whenever the system detects a specific sequence of patterns. Defining the triggering patterns sets the sequence order. You must define at least two patterns to enable selection of Sequential Trigger mode.

Note: Patterns, such as Primitives and Symbols or Frames, occurring very close together on different ports, cause an error in triggering.

To define a triggering sequence, select more than one pattern, then check the **Use selected patterns in a sequence** check box (see Figure 2.124 on page 168).

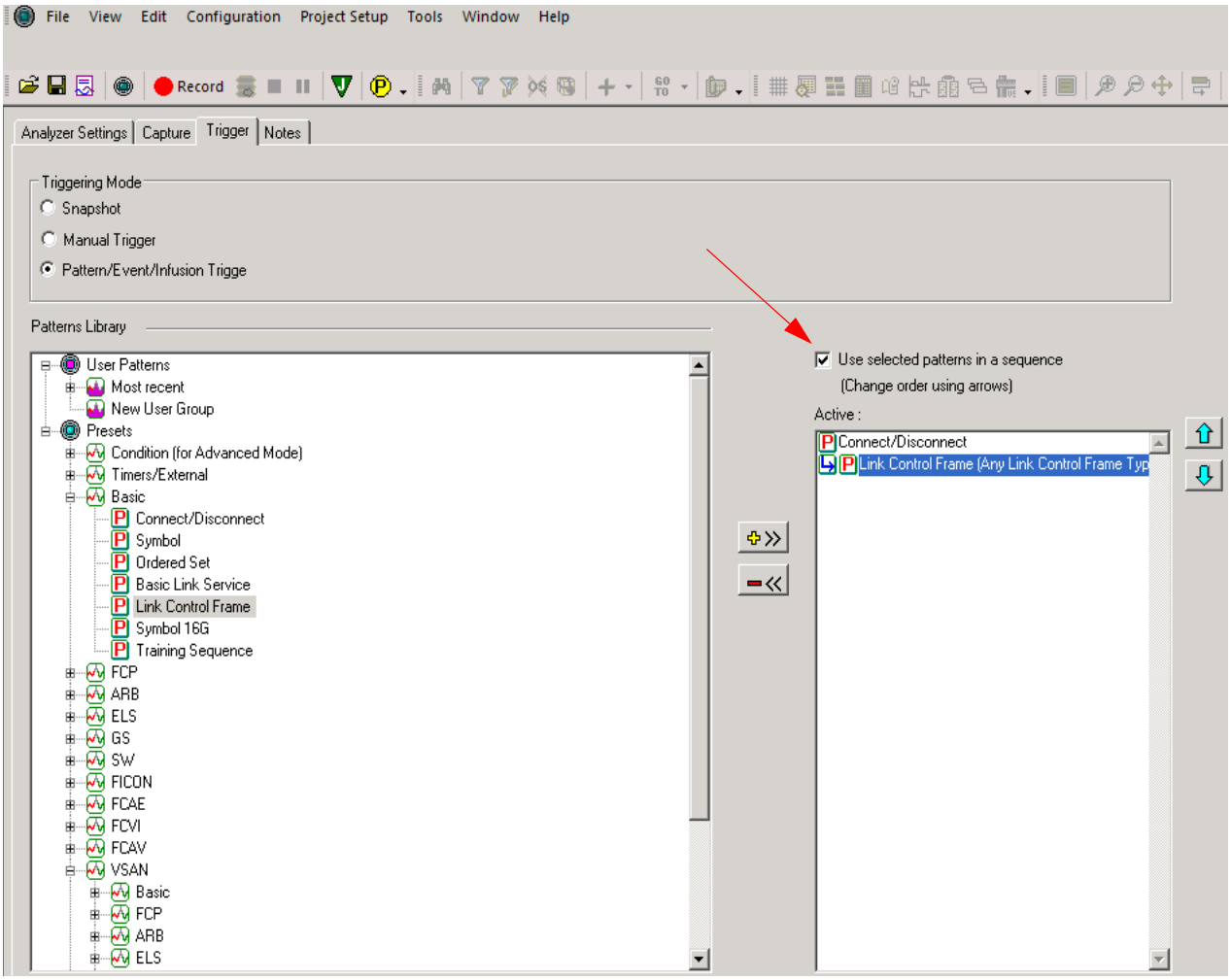


Figure 2.124: Select Sequential Trigger Mode

Timer

See "Timer" on page 157 for more information.

Defining Patterns

The definition of patterns for the sequential trigger mode is identical to the Pattern mode, with the following exception:

In sequential triggering mode, all the pattern dialogs display the option for setting to count the expected number of occurrences on each link. This allows you to specify the number of times that the pattern must occur before triggering or proceeding in the trigger sequence.

Figure 2.125: Number of Occurrences

Note: The Events on each link are counted independently, causing a trigger whenever the number of occurrences on any link equals the specified value.

Triggering Order

As triggering patterns are defined and added, they are displayed in the Project Overview pane sequentially in the order that they were entered under the Trigger category. When the project runs, the analyzer detects the occurrence of each pattern in order and triggers on the last one.

You can re-order the sequence of triggering patterns. To change the sequence order, highlight a trigger pattern and use the **Up** or **Down** arrow to move it to a new position.

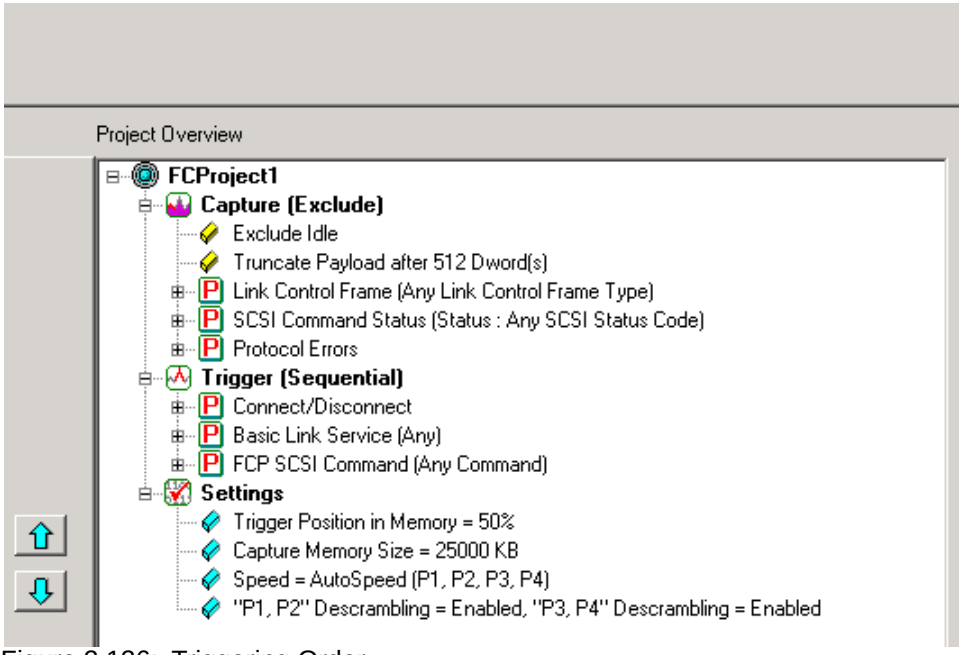

Project Overview
FCProject1
Capture (Exclude)
Exclude Idle
Truncate Payload after 512 Dword(s)
Link Control Frame (Any Link Control Frame Type)
SCSI Command Status (Status : Any SCSI Status Code)
Protocol Errors
Trigger (Sequential)
Connect/Disconnect
Basic Link Service (Any)
FCP SCSI Command (Any Command)
Settings
Trigger Position in Memory = 50%
Capture Memory Size = 25000 KB
Speed = AutoSpeed (P1, P2, P3, P4)
"P1, P2" Descrambling = Enabled, "P3, P4" Descrambling = Enabled

Figure 2.126: Triggering Order

Pre-Trigger

You can set the amount of data to capture before and after the trigger, as a percentage of pre-trigger, between 0% and 100%. Position the pre-trigger slider to a percentage. This feature allows the evaluation of bus activity leading up to and after the triggering Event. Figure 2.127: illustrates the operation of pre-trigger in data memory.

Pre-trigger data is capture of the specified percentage of data prior to the triggering Event. It cannot be guaranteed and may be 0. This can occur when the triggering Event occurs before storing the required amount of pre-trigger Event data. In such a case, the data display shows fewer than the specified data points prior to the triggering Event.

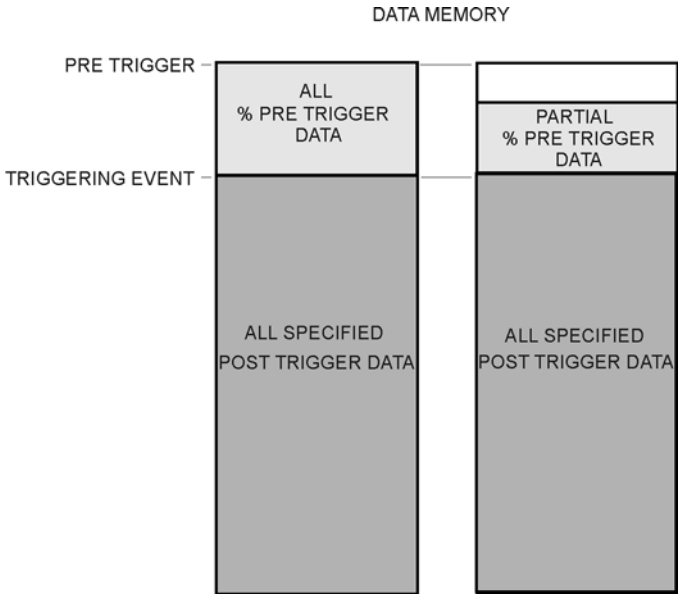


Figure 2.127: Pre-Trigger Example, 20% Pre-Trigger

Project Settings

To set project options, click the **Analyzer Settings** tab. The options on the Analyzer Settings are explained below.

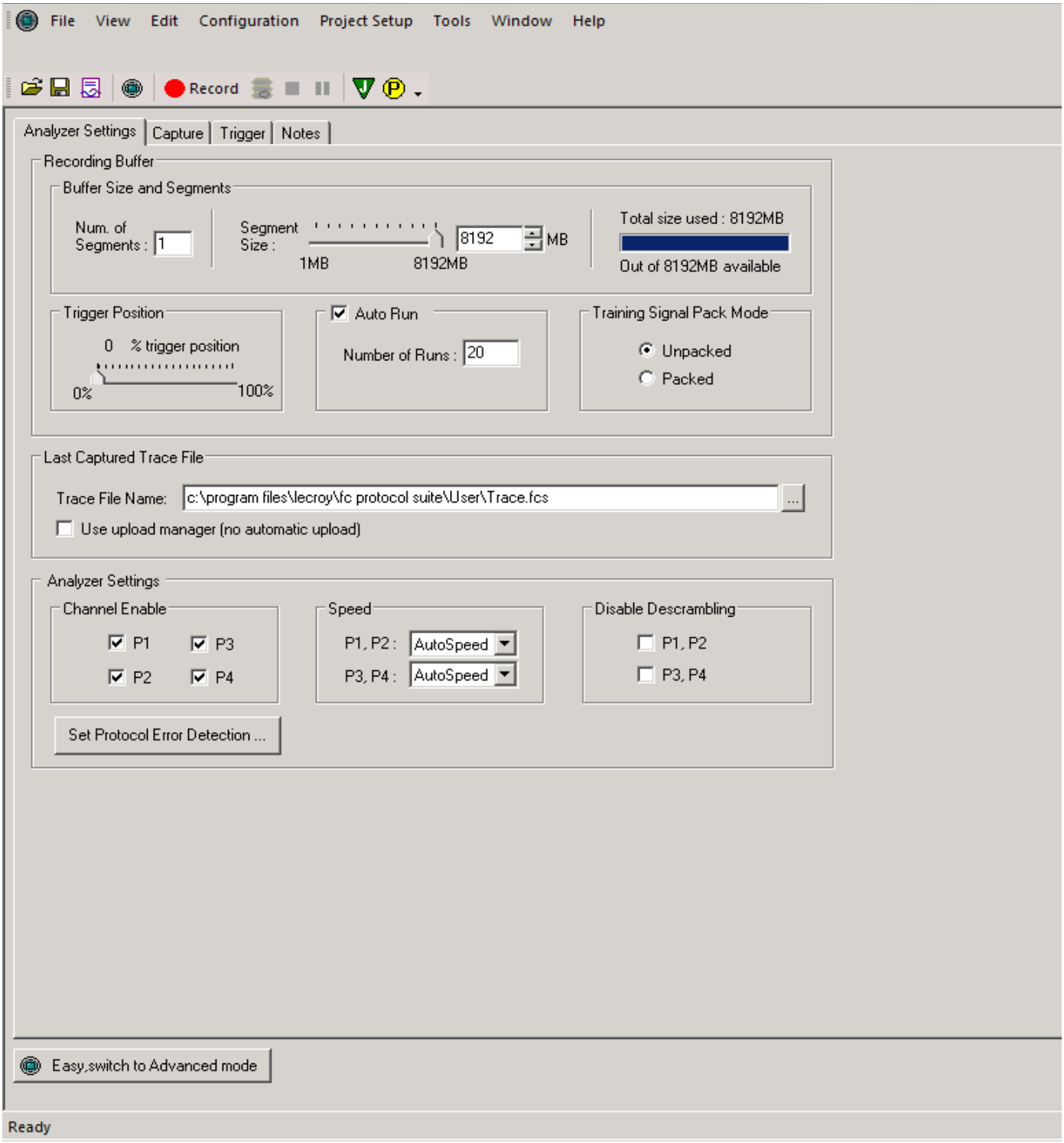


Figure 2.128: Setting Project Options

Buffer Size and Segments

The Analyzer Settings tab has the Recording Buffer pane where you can set Number of Segments and the Segment Size. The defaults are one segment of 25MB. The total size used is automatically displayed for you. Setting multiple segments will allow to trigger on the first occurrence of the trigger condition, fill up the first segment, then automatically re-arm the trigger and repeat the remaining number of segments specified. You can use the slider button or click the up or down arrow to change memory usage for recording trace data. (Minimum size of memory is 1MB. Maximum size of memory is dependent on the hardware.) (See Figure 2.1: on page 34.) Enter an integer **Num. of Segment**, from 1 to 32, then enter an integer **Segment Size** in kilobytes, up to the memory size in megabytes divided by the number of segments. The default 1.

The New Project dialog opens with default settings to capture Everything on the bus and to Trigger On on Snapshot. (The analyzer captures everything immediately without triggering on anything in particular.)

Each time a trigger condition occurs, the system records a new segment. You can use a Snapshot or Pattern trigger, but not Manual Trigger. As the same trigger automatically repeats, the system makes the number of segments that you entered.

Note: If the size of a data packet exceeds the buffer memory allocation, the project runs, but no data capture occurs. You must increase buffer memory size to a value greater than the packet size.

Trigger Position

You can set the trigger position in the captured buffer as a percentage of the segment size. Trigger point of 0% means the trigger point will be on the first packet in the buffer.

To upload segments automatically for display as the system creates them, do not select the checkbox.This defaults to 1, which defines the amount of data to capture before and after the triggering Event. You can change this percentage by dragging the slider.

In certain cases, when one port is recording traffic and filling up the memory much faster than another port, you might see traffic appearing only on one port for a while, and the other port's traffic will only appear later. This occurs as a function of the trigger position, and is normal, expected behavior of the analyzer.

To upload segments manually in the Segment Manager, select the **Use upload manager (no automatic upload)** checkbox. To upload segments automatically for display as the system creates them, do not select the checkbox.

Auto Run

To repeat the current capture and trigger setup automatically, check the **Auto Run** checkbox and enter the number of times in the **Number of Run** text box. The capture and trigger repeat automatically for the specified number of times, and the results are saved in consecutively numbered **Trace.scs** files. Each one will use the same settings as specified, and will create sequentially named traces. This is identical to pressing the record button several times in a row.

Trace File Name

Click the ellipses next to the **Trace File Name** text box and choose a file name and location for the results of your current project.

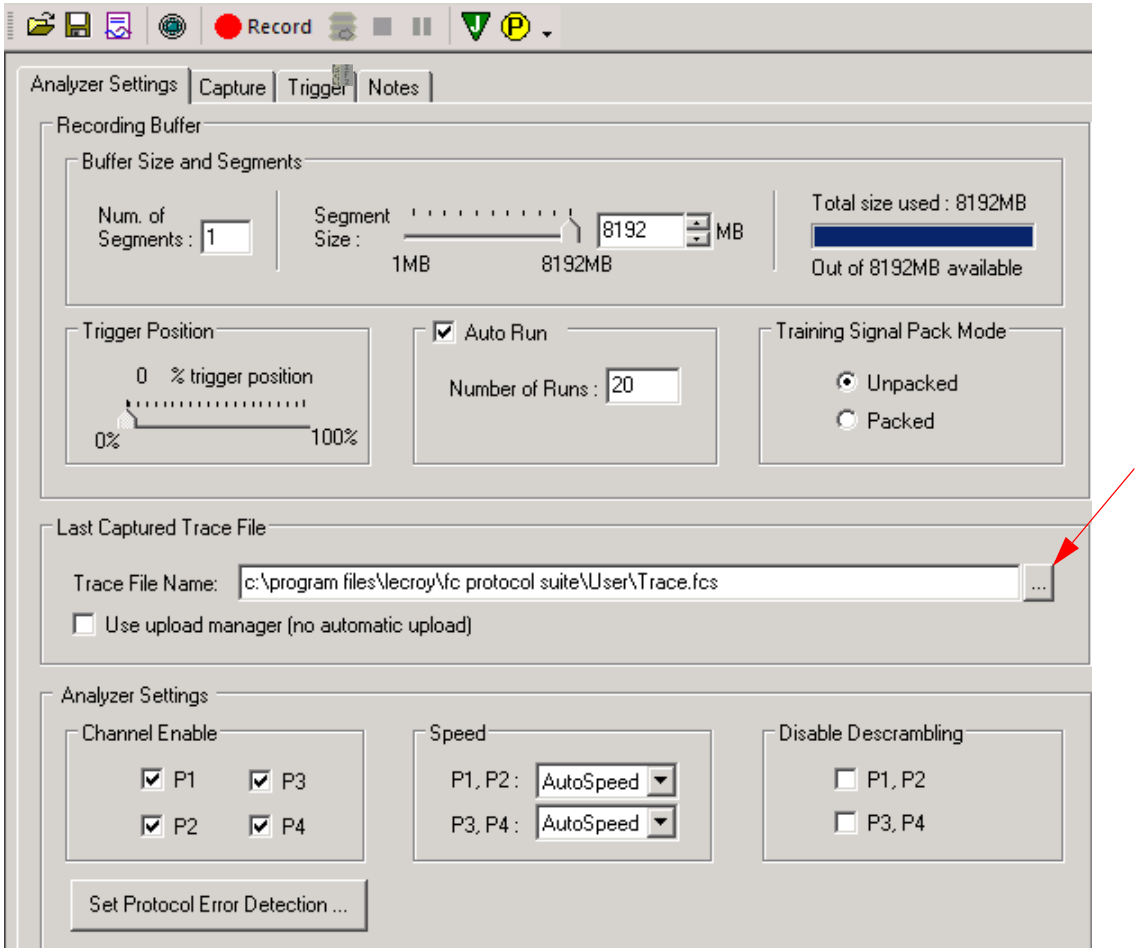


Figure 2.129: Trace File Name

Upload Manager

To view recorded segmented trace files, click the **Upload Manager** button, beside the Record button, to display the Upload Manager dialog.

Note: The **Upload Manager** button is active (green) only after you record a trace.

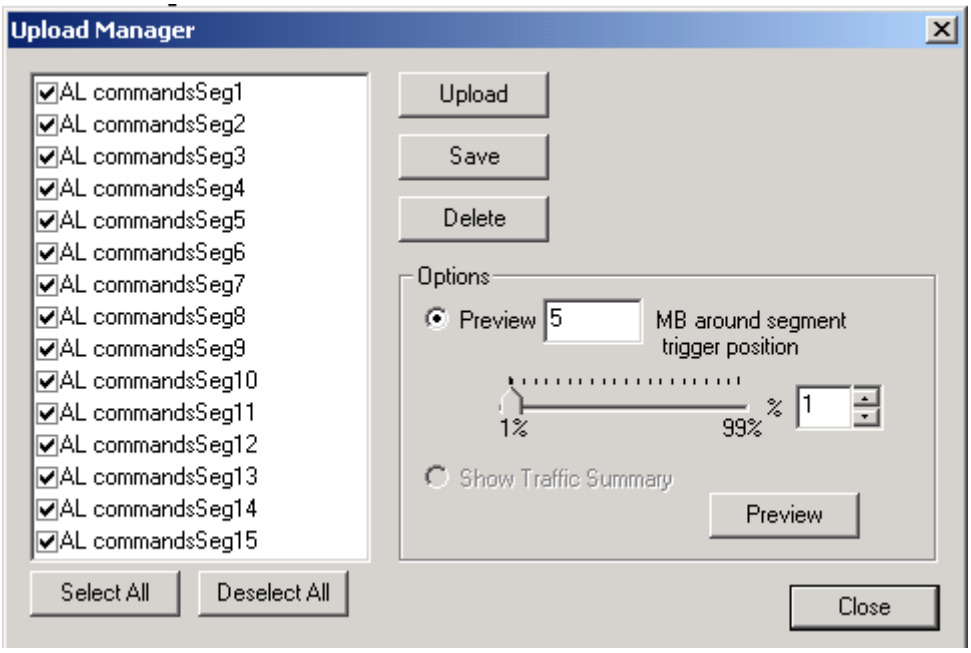


Figure 2.130: Upload Manager Dialog

The dialog displays the segments in the format Segment1, Segment2, and so on.

Select segments by clicking the checkbox. You can also **Select All** or **Deselect All** segments.

You can **Upload** segments for display, **Save** segments as sample files, and **Delete** segments.

The **Preview** radio button allows a preview of an integer number of megabytes around the trigger position. You can set the trigger position as a percentage and select the segment number. Click the radio button to **Show Traffic Summary** with the preview. To show the preview, click the **Preview** button.

Analyzer Settings

Channel Enable

Check the relevant ports to enable them.

Note: If a Port ID check box has no check, the analyzer does not capture any patterns for that port. The system allocates trace memory for that port to its adjacent port, for example: P1 <-> P2.

Speed
The default speed is **Autospeed**. You can also select the port speed from the drop-down list: 1.0 Gbps, 2.0 Gbps, 4.0 Gbps, 8.0 Gbps or 16 Gbps.

Disable Descrambling
If checked, causes the Analyzer to assume that no traffic is scrambled. By default, the Analyzer assumes the scrambling state of the devices under test.

Protocol Error Detection
Click the **Set Protocol Error Detection** button to open the Protocol Error Detection dialog.

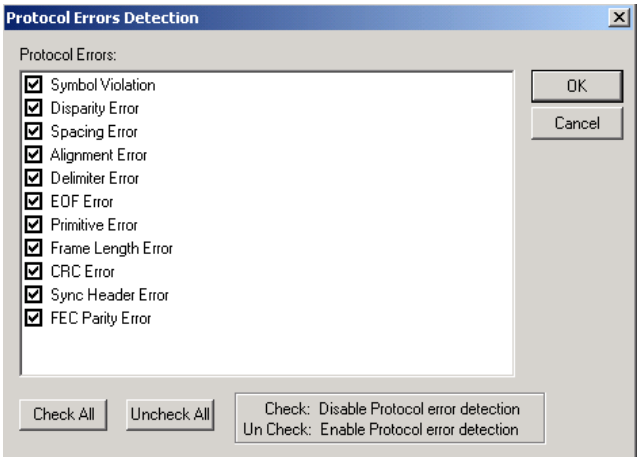


Figure 2.131: Protocol Errors Dialog

Uncheck specific Protocol Errors in order to not display them in the sample view and Statistical Report.

Notes

Add a Project Note

To enter and save information about the current project, click the **Notes** tab and enter the data about the project.

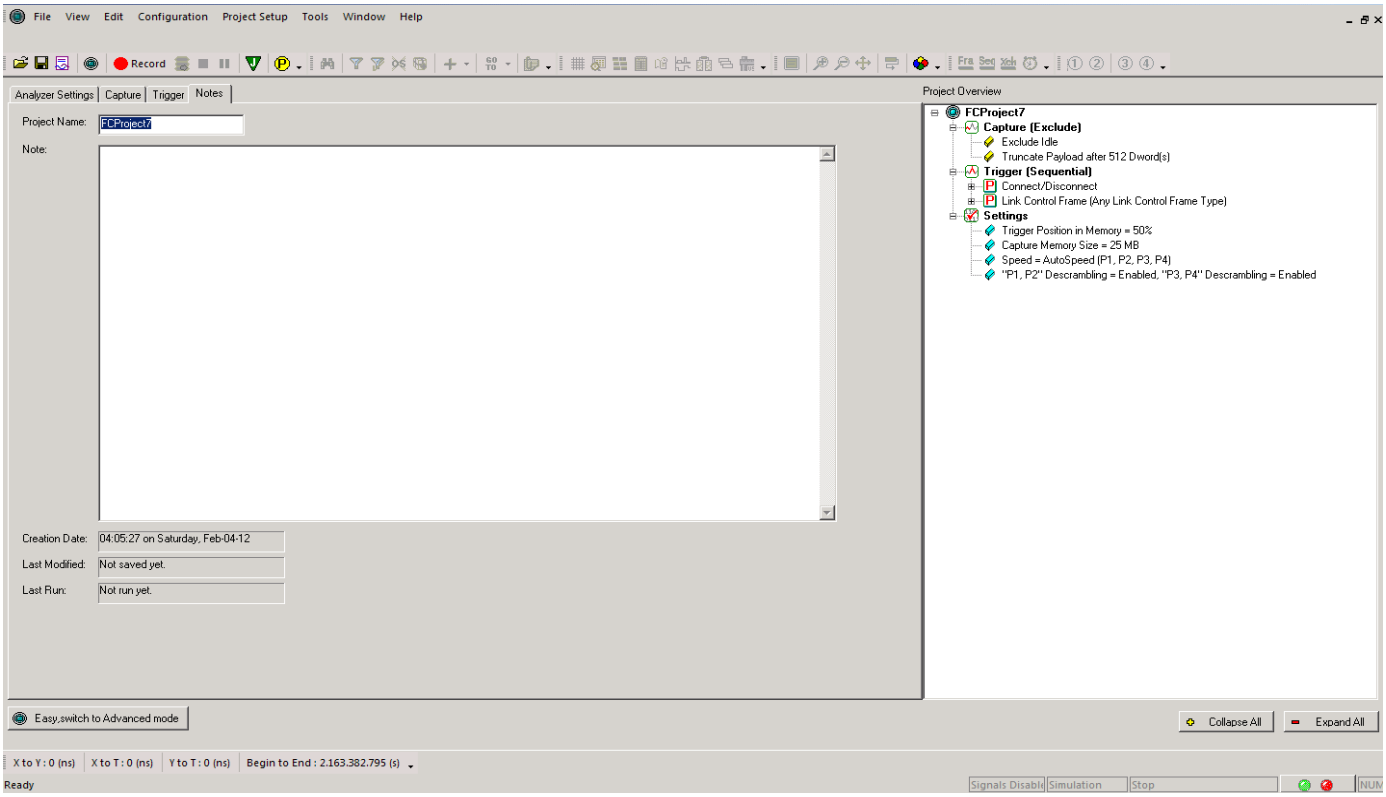

File View Edit Configuration Project Setup Tools Window Help
Record
Analyzer Settings | Capture | Trigger | Notes
Project Name: FCProject7
Note:
Creation Date: 04:05:27 on Saturday, Feb-04-12
Last Modified: Not saved yet.
Last Run: Not run yet.
Project Overview
FCProject7
Capture (Exclude)
Exclude Idle
Truncate Payload after 512 Dword(s)
Trigger (Sequential)
Connect/Disconnect
Link Control Frame (Any Link Control Frame Type)
Settings
Trigger Position in Memory = 50%
Capture Memory Size = 25 MB
Speed = AutoSpeed (P1, P2, P3, P4)
"P1, P2" Descrambling = Enabled, "P3, P4" Descrambling = Enabled
Easy,switch to Advanced mode
Collapse All
Expand All
X to Y : 0 (ns)
X to T : 0 (ns)
Y to T : 0 (ns)
Begin to End : 2.163.382.795 (s)
Ready
Signals Disabl
Simulation
Stop

Figure 2.132: Project Notes Tab

Advanced Mode (User-Defined)

Advanced Mode expands Analysis capability by allowing you to program complex triggering and data capture projects.

The Advanced Mode is a state machine with up to 23 different states. You can program each state individually to:

- Trigger on a different Event or trigger unconditionally.
- Capture Everything, Nothing, or a user-defined pattern.
- Include up to three ELSE IF statements, allowing a jump to any other state based on a user definition.
- Use up to three timers, which you can set to a maximum value of 4294900 ms or over one hour. If you enter a value larger than 42494900ms a warning pop-up displays: I**nvalid value! Please enter a value between 0 and 4294900**.You can set a timer in the state or continue the timer set in the previous state.
- Output an external trigger High or Low.

Note: In Advanced Mode, Events on each link are counted independently. A condition is met if the number of Events on a link equals the defined occurrence.

Working in Advanced Mode

To start working in the Advanced Mode, click the **Easy, Switch to Advanced Mode** button in an open Analyzer window.

You can:

- Display the state definition
- Set Output Trigger level
- Select up to three timers
- Define the If condition and up to three Else If conditions
- Set number of occurrences before trigger
- Set captured data
- Set excluded data
- Go to next state
- Add state
- Choose link for Sequencer setup

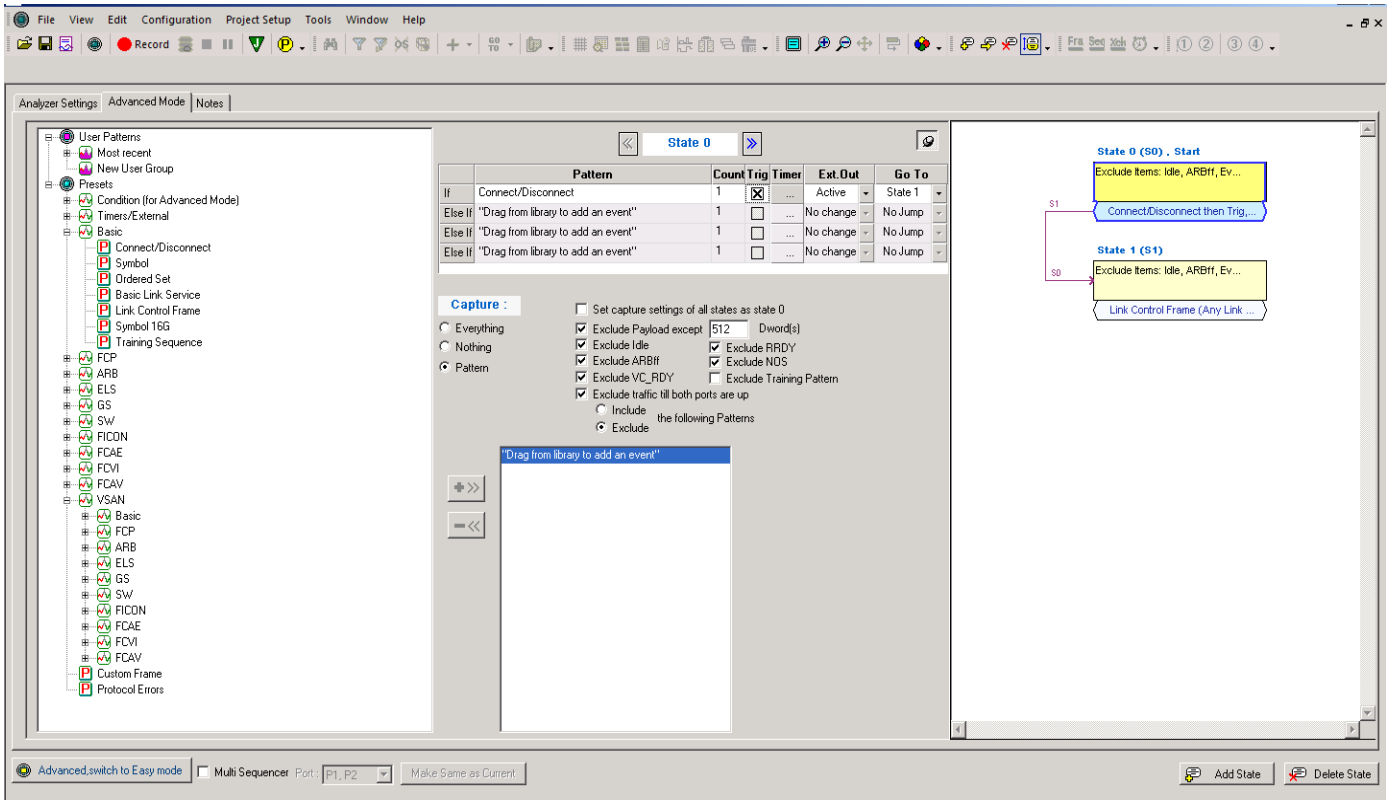


Figure 2.133: State Programming Dialog

Setting Trigger Conditions

To set the If and Else If trigger condition:

1. Click the **Add Pattern** button for a Pattern field and choose a trigger condition from the drop-down list.

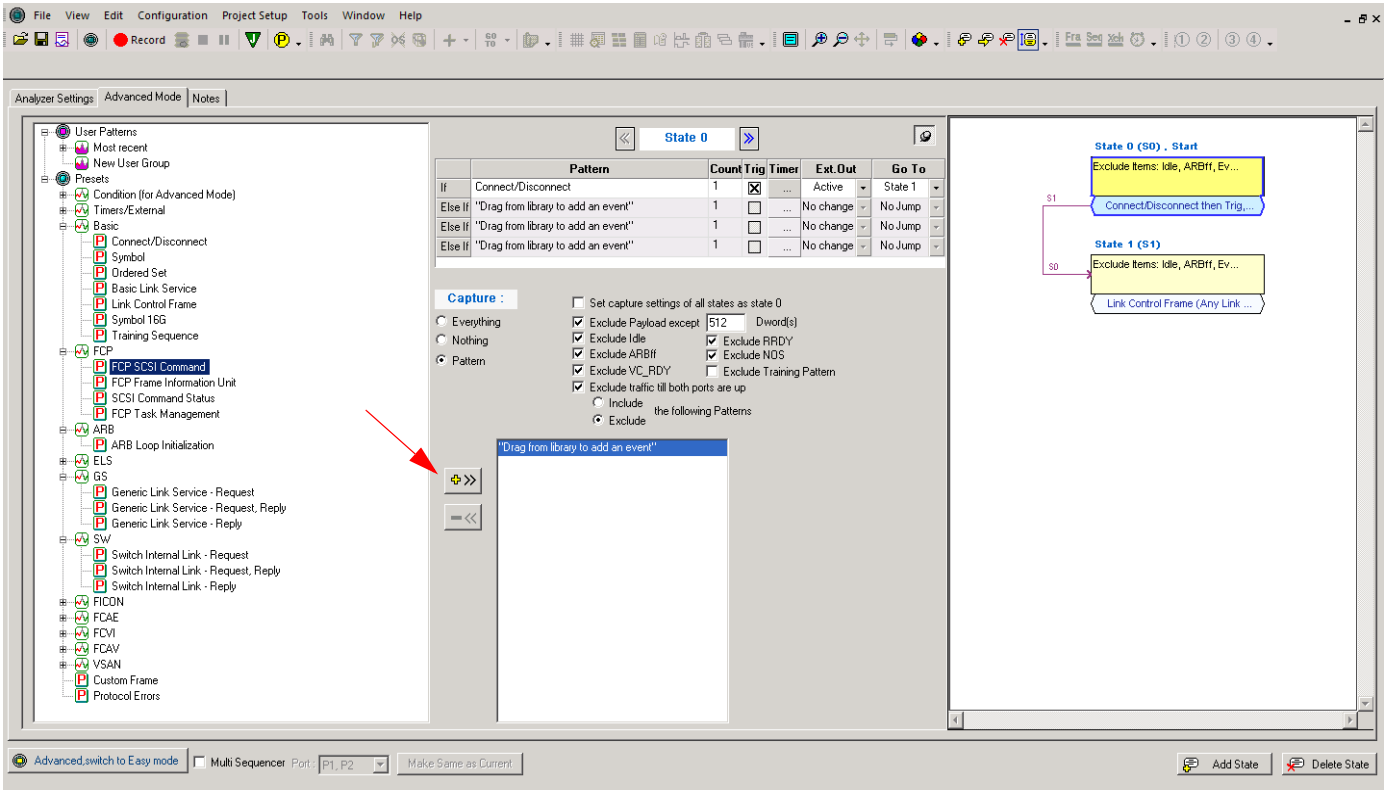


Figure 2.134: Choosing a Trigger Condition

2. Define each selected pattern in the same way as in Easy Mode, as described starting on page 47. To use a timer, define it first.

Note: You can set a timer for any If or Else If condition.

3. Enter a value for the number of occurrences before trigger in the **Cont** field, up to a maximum of 65535 occurrences.
4. Choose a capture option: **Everything, Nothing,** or **Pattern**.
5. If you choose Everything, you can select primitives for exclusion. See "Parameters" on page 36.

   If you choose Pattern, you can select patterns for inclusion or exclusion. See "Defining Patterns" on page 47.
6. Choose pattern(s) and click the **+>>** button to add them for capture or exclusion. You define each pattern the same way as in Easy mode ("Defining Patterns" on page 47).
7. For an output trigger, click the down arrow in the **Ext. Out** field and choose an output trigger level. **Note:** Do not use the LOW setting in Advanced Mode.

8. To go to another state, click the down arrow in the **Go To** field and select a state. If no other state has been defined, choose **New State** to add a state.

Multi-Link Triggering

You can set different triggering for each link. To set different trigger conditions for a link, check the **Multi Sequencer** check box and select the link for setup from the Port drop-down list. When you select this option, you can define a sequencer per link (pair port). These sequencers are independent from each other and will be run separately on each link.

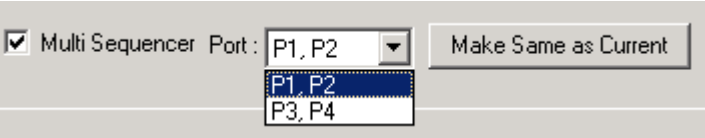


Figure 2.135: Multi-Link Triggering Setup

Set Timers

You can set and use up to three timers for triggering. You can set each timer for each state or continue from a timer set in the previous state. The timer defined for a particular state starts when entering that state. To set timers, click the **ellipses** in the **Timer** field in each state and define each of the timers in the Timer Pattern dialog.

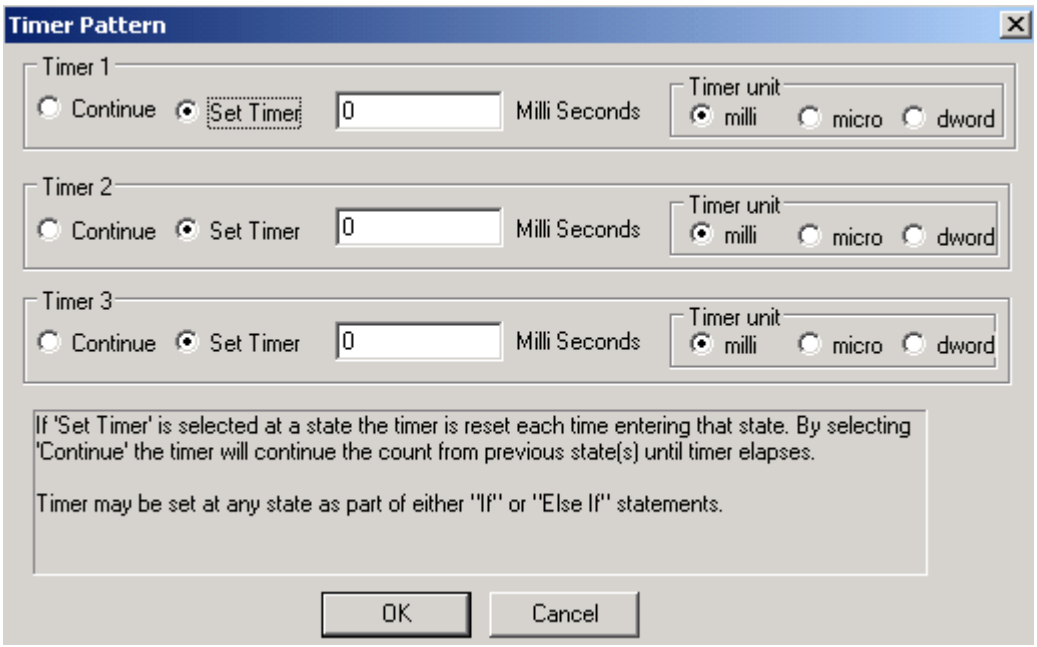


Figure 2.136: Timer Pattern Dialog

Note: Three timers are available. You have to set and start each timer in order to continue the next timer. For example, you have to start Timer 1, continue it, then set Timer 2 in order to continue it. It will not allow you to continue Timer 2 until you first set it.

Useful Key Sequences

The following key sequences are active to assist you in navigating a defined state machine:

Ctrl+a	Add State
Insert	Insert State
Del	Delete State
Ctrl+c/Ctrl+Ins	Copy
Ctrl+v/Shift+Ins	Paste
Up/Down arrow keys	Moves selection between states
Page Up/Page Down	Page Up and Page Down states
Home	Go to first page
End	Go to end page

Project Settings

Prior to running the Advanced mode project, click the **Settings** tab. The options in the Settings dialog are the same as for the Easy Mode, described starting on page 171.

Notes

To include some descriptive information about the project, click the **Notes** tab and enter a brief descriptive note (See “Notes” on page 176).

Chapter 3

Display Manipulation

Viewer Display

After data is captured (Recorded), the Viewer displays a **.fcs** sample file in Packet View.

Note that statistics are available only after the whole trace has uploaded.

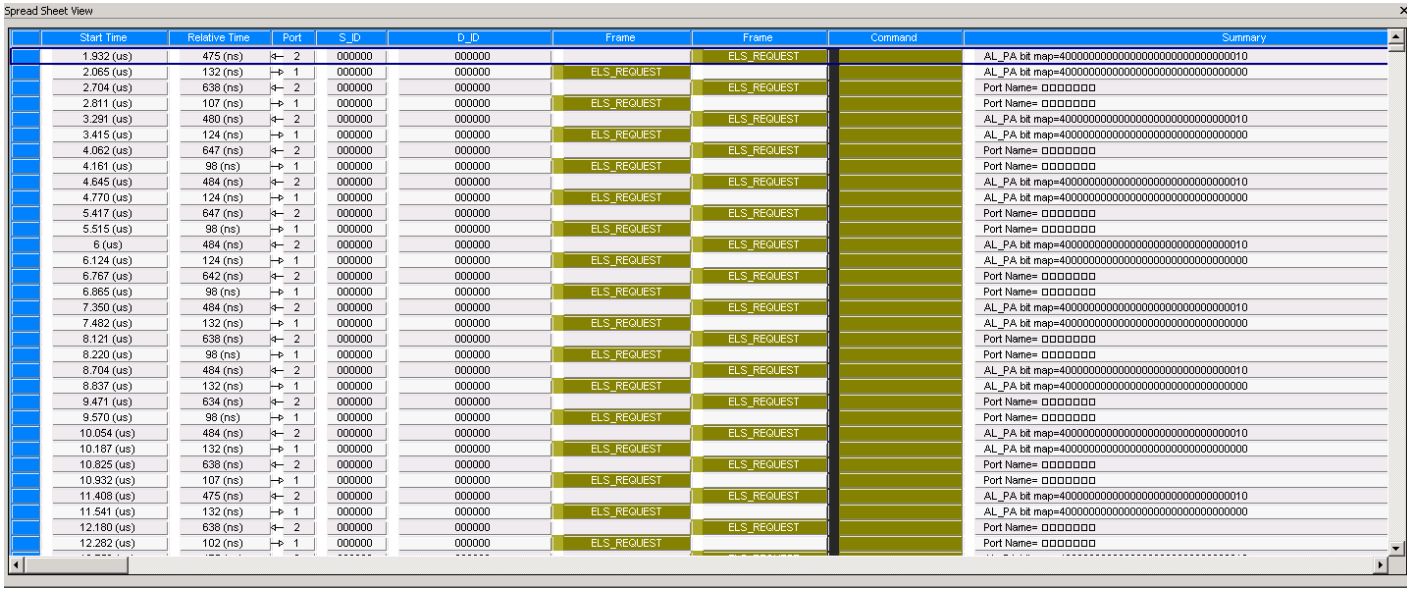


Figure 3.1: Spreadsheet View

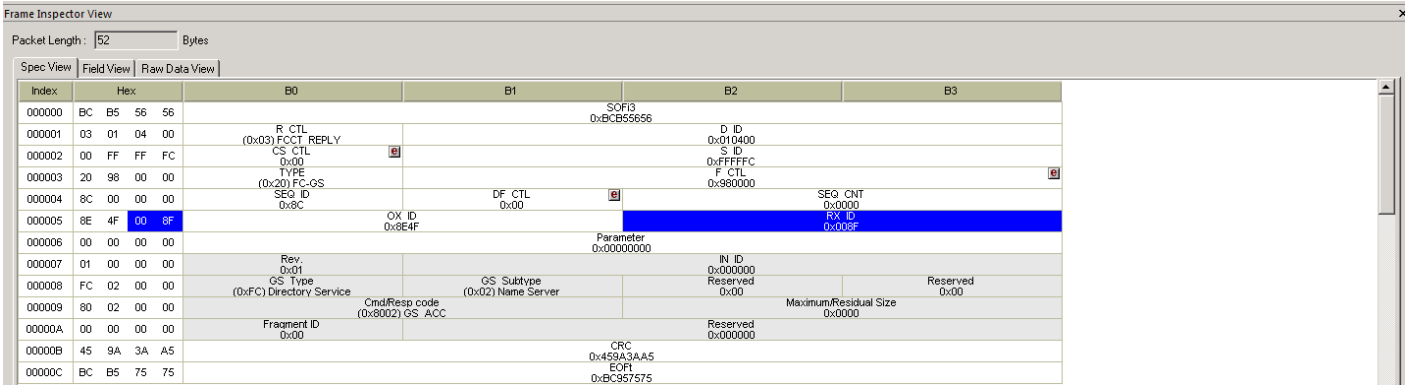


Figure 3.2: Frame Inspector View

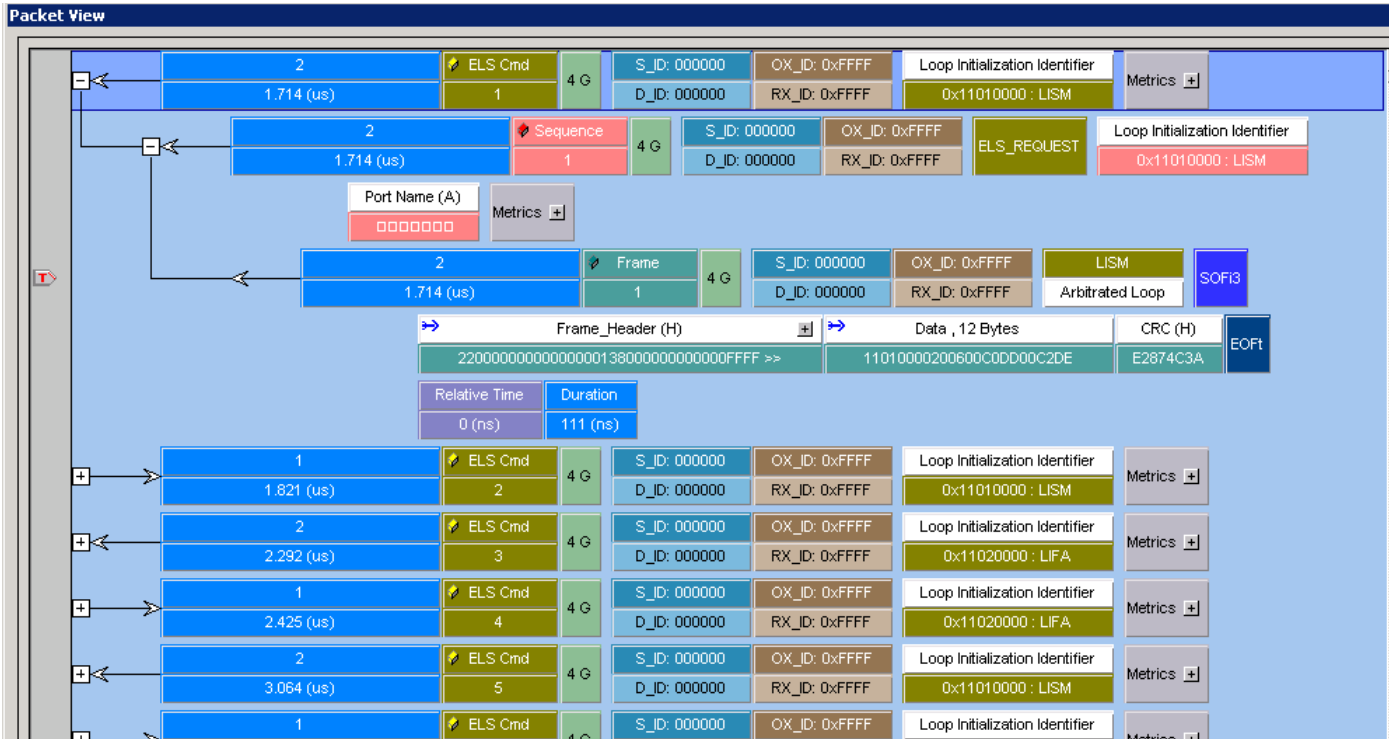
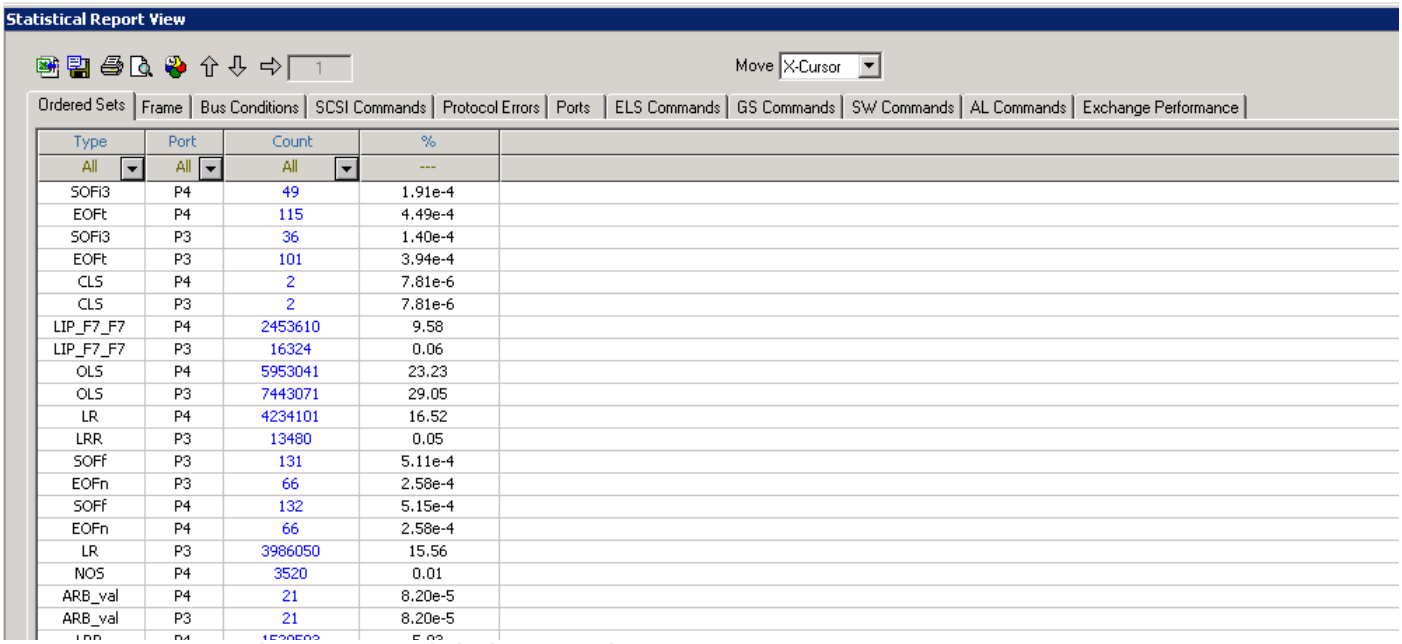


Figure 3.3: Packet View

Figure 3.4: Text View



Type	Port	Count	%
All	All	All	---
SOFi3	P4	49	1.91e-4
EOFt	P4	115	4.49e-4
SOFi3	P3	36	1.40e-4
EOFt	P3	101	3.94e-4
CLS	P4	2	7.81e-6
CLS	P3	2	7.81e-6
LIP_F7_F7	P4	2453610	9.58
LIP_F7_F7	P3	16324	0.06
OLS	P4	5953041	23.23
OLS	P3	7443071	29.05
LR	P4	4234101	16.52
LRR	P3	13480	0.05
SOFf	P3	131	5.11e-4
EOFn	P3	66	2.58e-4
SOFf	P4	132	5.15e-4
EOFn	P4	66	2.58e-4
LR	P3	3986050	15.56
NOS	P4	3520	0.01
ARB_val	P4	21	8.20e-5
ARB_val	P3	21	8.20e-5

Figure 3.5: Statistical Report View

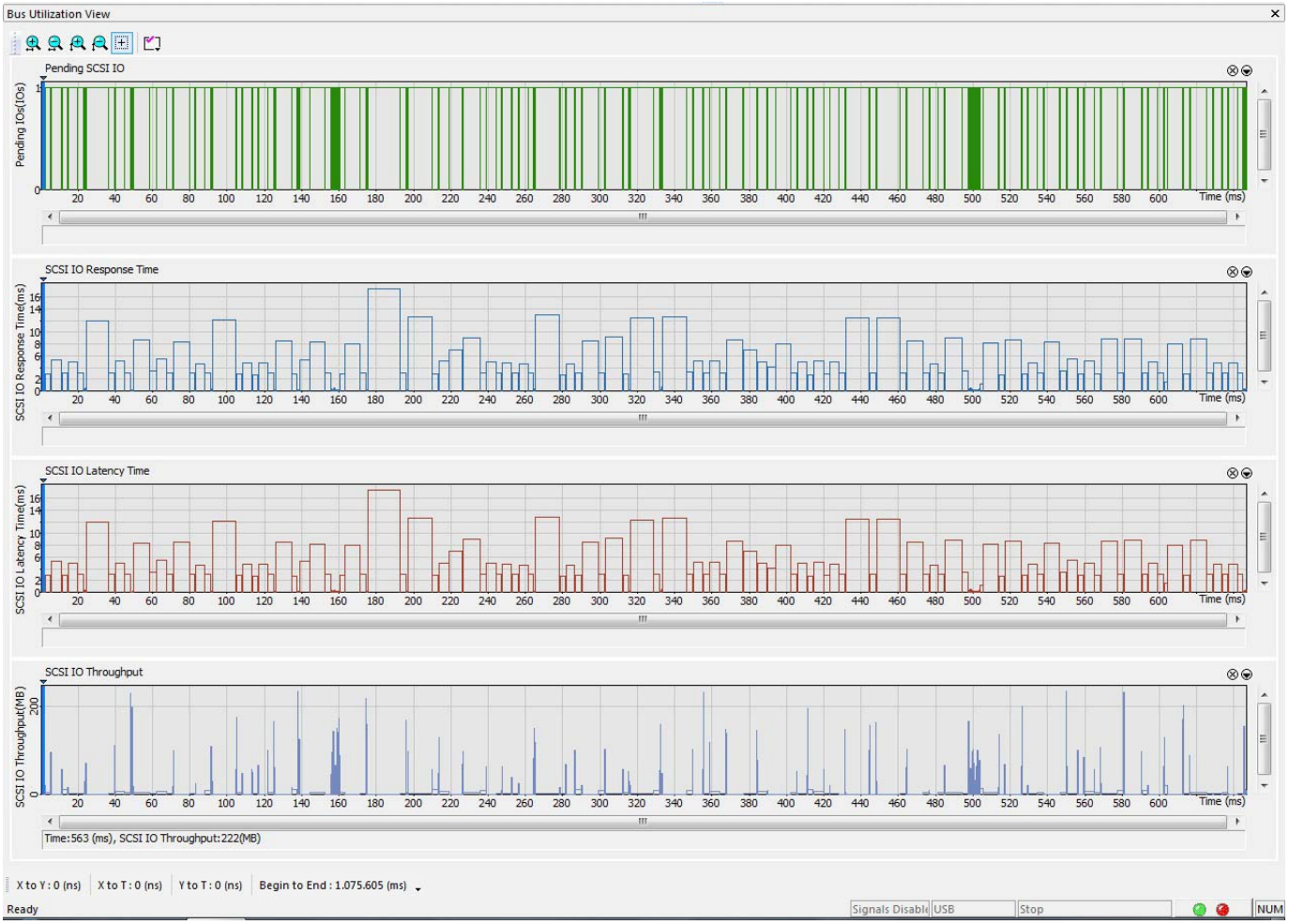


Figure 3.6: Bus Utilization View

You can configure the data viewer display. Toolbars are available for quick access to data viewer display features.

You can display the same data in:

- Spreadsheet view
- Frame Inspector View
- Packet view
- Text view
- Statistical Report view
- Bus Utilization View

Note: You can change the view type when opening a sample by changing the default workspace or by saving options in the **Software Setting** dialog.

Quick View

By default, the Software Settings enable **Quick View**. Quick View allows full access to the whole trace more quickly, especially when using a Gigabit Ethernet connection. However, the trace is NOT written to the host machine hard drive. To save the trace, you must manually click **Save**.

If you uncheck **Quick View** in the Software Settings to disable Quick View, the trace loads more slowly, but is automatically saved to the host machine hard drive. When Quick View is disabled, the Viewer displays successive parts of trace data as they upload. As soon as a trace part uploads, it is available in all trace views.

If you only need quick successive traces, and do not need to save them, keep the default setting to enable Quick View.

If you need to save all captured traces, unchecking the Quick View setting loads traces faster, especially for larger traces and slower connections than Gigabit Ethernet.

To refresh the viewer display with more uploaded data, scroll to the end of the trace, using scroll bars, page down, arrow down, or CTRL-End. Newly uploaded data then appears there.

Note: High-level decoding and statistics are available only after the whole trace has uploaded.

The software automatically switches to full trace view after trace uploading finishes.

Users must press CTRL Home to go to the beginning of an uploaded trace, and CTRL End to go to the end of an uploaded trace.

Switching Views

To display the capture in any other available view, select from the View menu or from the Show View Type toolbar.

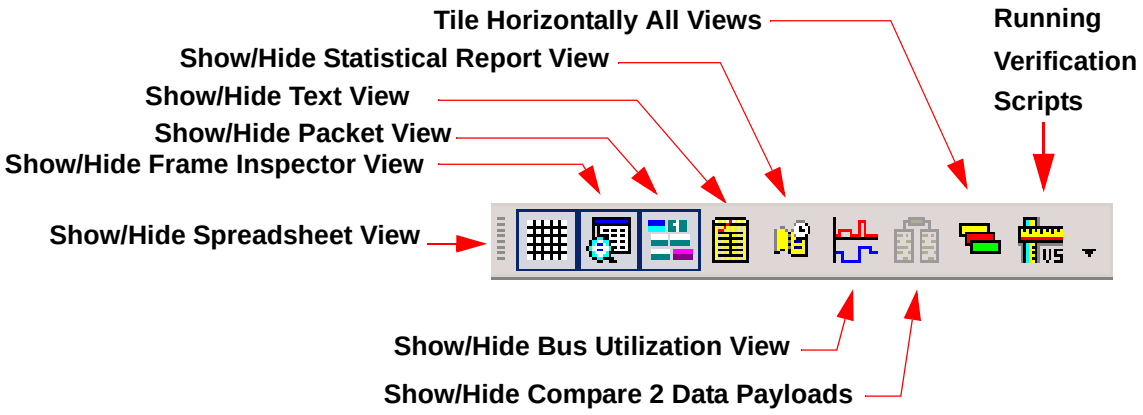


Figure 3.7: View Type Toolbar

After you select a view, it appears in a separate window. To increase the new window display size, select **View > Packet View** or click the **Show/Hide Packet View** button to hide the Packet View.

When scrolling through a window display using the scroll bar, the displays in the other windows also scroll.

To rearrange the tiling, select the **Window** menu and choose **Cascade, Tile Horizontal,** or **Tile Vertical**.

Spreadsheet View

Spreadsheet View displays all of the Packet View fields in a time sequential spreadsheet format.

To display the Spreadsheet View of the current capture, click **View > Spreadsheet View** or click the button on the Show View Type toolbar.

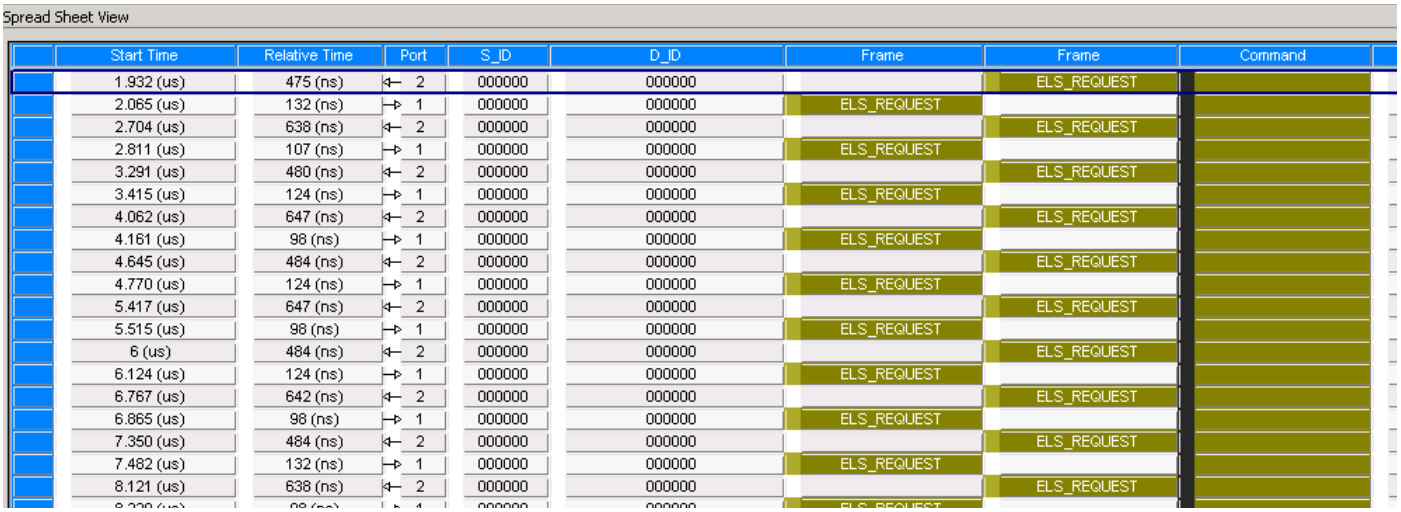


Figure 3.8: Spreadsheet View

Save As Text/Excel

Select **File > Save As Text/Excel** to open the Save As Text dialog.

For Save As Type, select **Text Files** or **Excel Files**.

For Save As Range, select **All Packets** or enter a cursor range.

For Time Stamp From and To enter values.

Enter a **File Name** and click **Save**.

Note: The Save As Excel option is available only for Spreadsheet View and Text View.

Trace Viewer Configuration

In Spreadsheet View, you can also click the **Trace Viewer Configuration** icon button to display the Trace Viewer Configuration dialog (see Figure 3.10). Expand the **Frame Fields, Sequence Fields, SCSI Cmd Fields, ELS Cmd Fields SW Cmd Fields, GS Cmd Fields, FICON Fields, Additional Fields, Text View and Spread Sheet View** to change the settings.

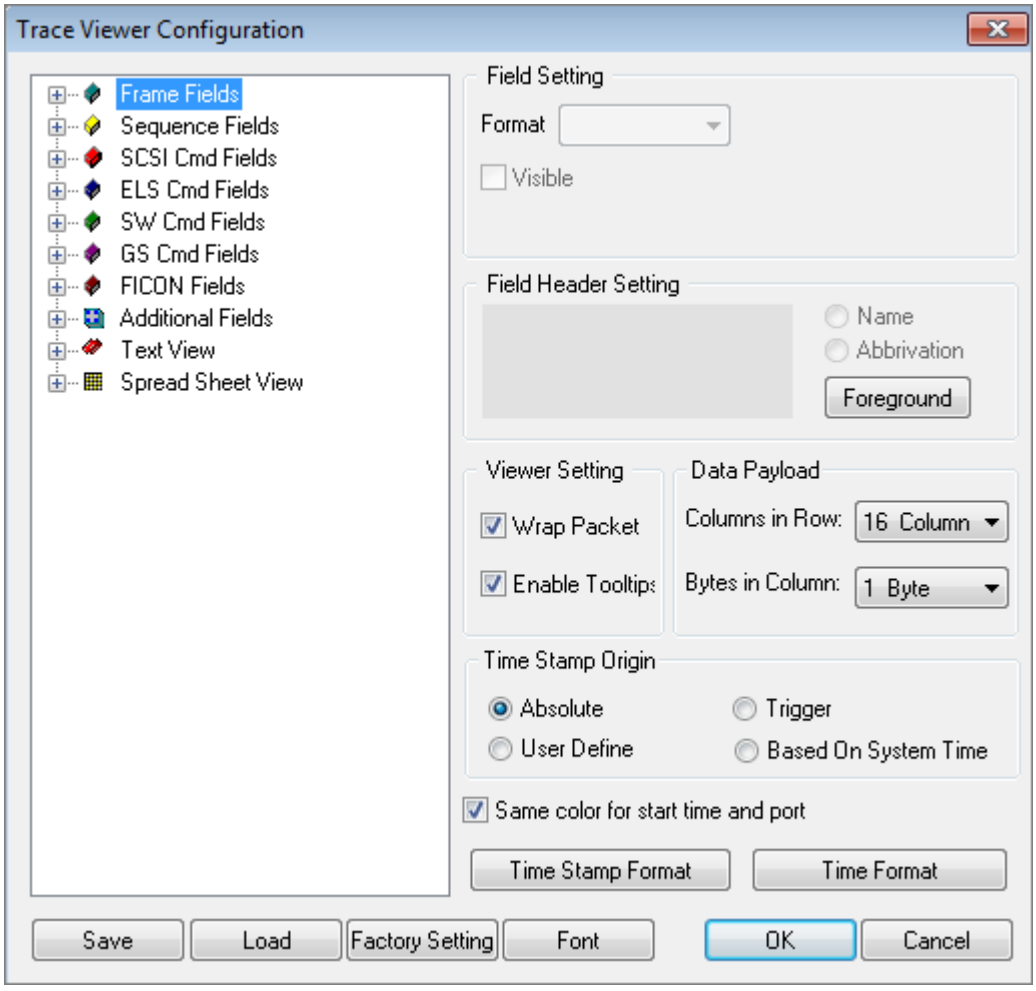
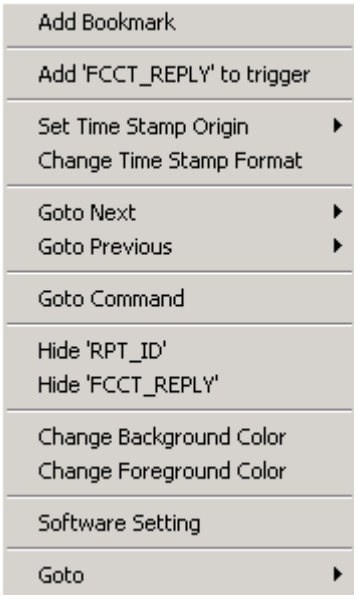


Figure 3.9: Trace Viewer Configuration Dialog

Spread Sheet View Menu Options

Right-click on any of the columns in the Spread Sheet view to display a list of menu options (see Figure 3.10 on page 188).

You can also show or hide a port by right-clicking a **Port ID** in Spread Sheet View and choosing **Show** or **Hide**.



This **Add xxx to trigger** allows a quick setting of the trigger for the next recording as the item on which the right click was done

Figure 3.10: Menu Options in Spread Sheet View

Bookmark	You can create bookmarks, delete and Goto bookmarks.
Add xxx to trigger	This option is context sensitive. This option allows a quick setting of the trigger for the next recording as the item on which the right click was done.
Set Time Stamp Origin:	There are four options to set time stamp origin.
•Absolute:	Sets the time stamp to zero when the recording starts. The first time in the trace might have the time stamp larger than zero due to filtering, hiding or other reasons such as recording started in the middle of a frame.
•Trigger:	Sets time to when the trace was triggered.
•Current Position:	Sets time to the current position.
•Based on System Time:	Sets time based on the system time.
Change Time Stamp Format:	Select options to display time stamp format.
Goto Next:	Displays options to go to the next location.
Goto Previous:	Displays options to go to the previous location.
Goto Response:	Displays options to go to the response location.
Hide:	This option is context sensitive, it displays the relevant option to hide it.
Change Background Color:	Displays colors to change the background.
Change Foreground Color:	Displays colors to change the foreground.
Software Setting:	Select options to set the software. For detailed information see “Software Settings” on page 250.
Goto:	Displays options to go to X or Y Position, Packet No., Time Stamp, Bookmark, Begin and End.

Add, Edit and Delete Columns

You can customize the columns display by adding, editing or deleting columns. Right-click on the column header and select an option. Selecting Add Columns displays the following dialog.

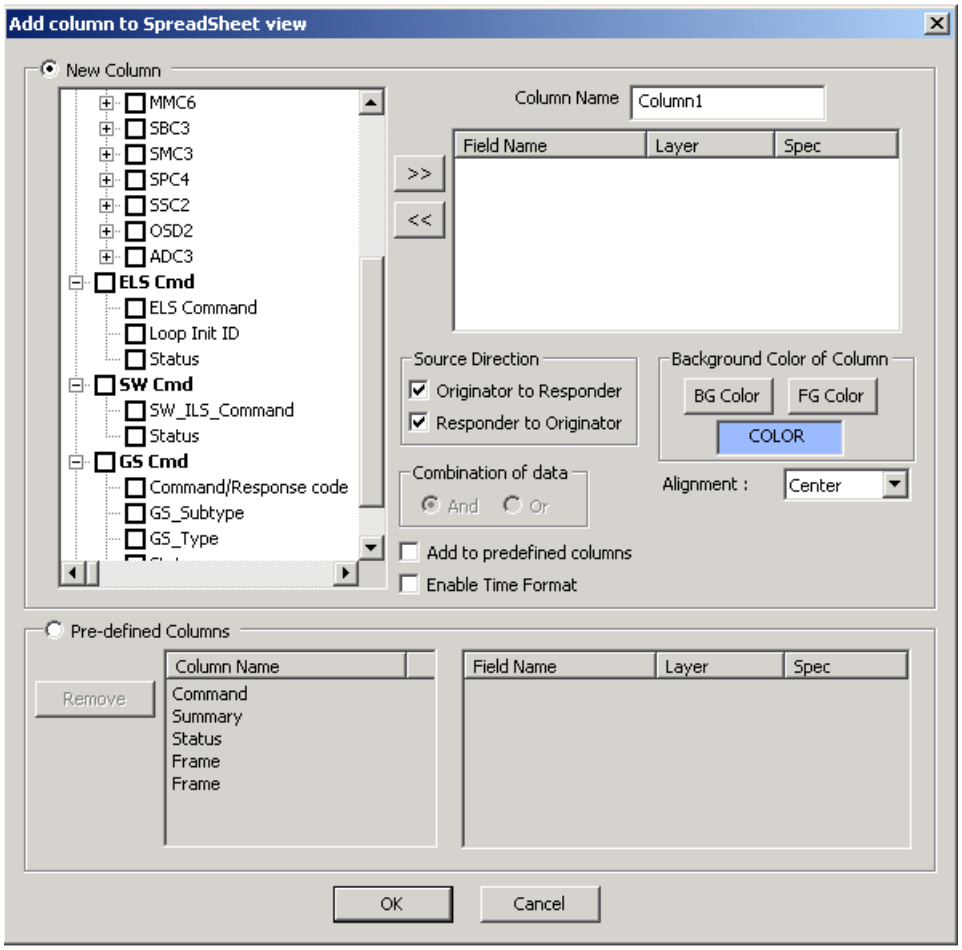


Figure 3.11: Add Column to Spread Sheet View Dialog

Frame Inspector View

Frame Inspector View has lots of information that is available in Packet View, but not Spreadsheet View, so it is most useful in conjunction with the Spreadsheet View.
This view has the following three tabs:

Spec View:

This view shows the Frame as it would appear in the spec, with the field names and values spelled out clearly. Fields that are too short to clearly contain the description can be viewed as tooltips by hovering the mouse over them. Some fields might have a a lowercase ‘e’ button at the top right corner. Pressing this button displays an ‘expanded’ view of the sub-fields in this field.

Field View:

This view shows, when applicable, a hierarchical display of the selected Packet, with the relevant fields in each level.

Raw Data View:

This view shows Hex, 10-bit and Running Disparity views of each dword in the selected packet.

To open a Frame Inspector View of the current capture, select **View > Frame Inspector View** or click the button on the View Type toolbar.

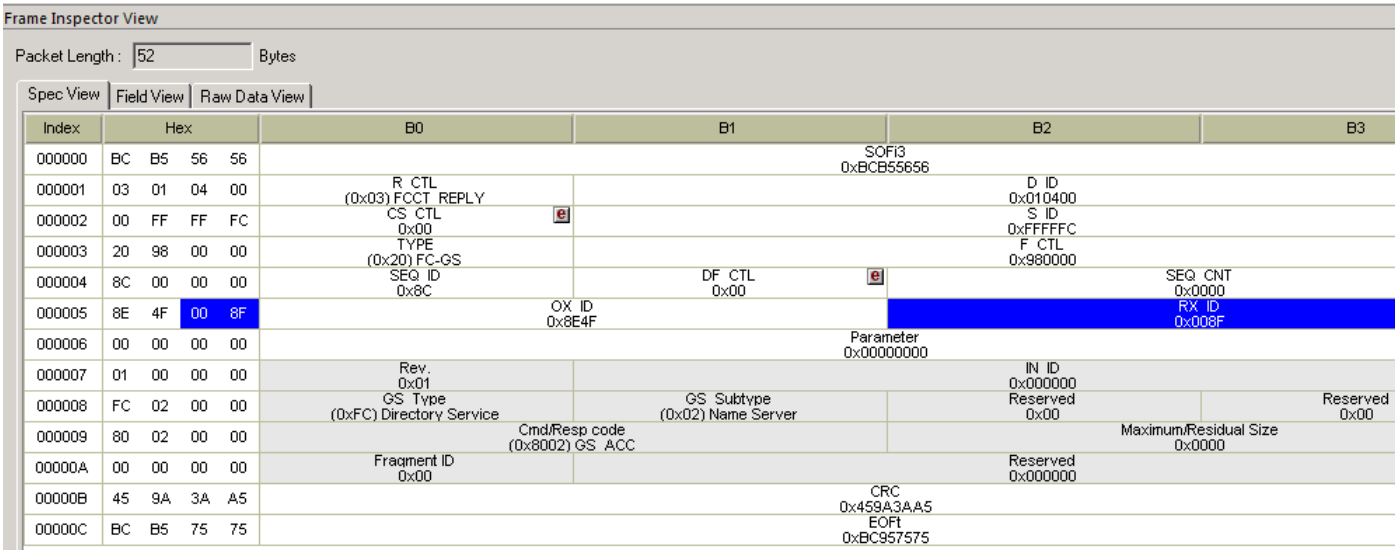

Frame Inspector View
Packet Length : 52 Bytes
Spec View
Field View
Raw Data View
Index
Hex
B0
B1
B2
B3
000000 BC B5 56 56 SOFi3 0xBCB55656
000001 03 01 04 00 R_CTL (0x03) FCCT_REPLY D_ID 0x010400
000002 00 FF FF FC CS_CTL 0x00 S_ID 0xFFFFFC
000003 20 98 00 00 TYPE (0x20) FC-GS F_CTL 0x980000
000004 8C 00 00 00 SEQ_ID 0x8C DF_CTL 0x00 SEQ_CNT 0x0000
000005 8E 4F 00 8F OX_ID 0x8E4F RX_ID 0x008F
000006 00 00 00 00 Parameter 0x00000000
000007 01 00 00 00 Rev. 0x01 IN_ID 0x000000
000008 FC 02 00 00 GS_Type (0xFC) Directory Service GS_Subtype (0x02) Name Server Reserved 0x00 Reserved 0x00
000009 80 02 00 00 Cmd/Resp code (0x8002) GS_ACC Maximum/Residual Size 0x0000
00000A 00 00 00 00 Fragment ID 0x00 Reserved 0x000000
00000B 45 9A 3A A5 CRC 0x459A3AA5
00000C BC B5 75 75 EOFt 0xBC957575

Figure 3.12: Frame Inspector View

Raw Data View - Frame Inspector View for 64b/66b Decoding

Raw Data View in the **Frame Inspector View** window shows the exact bit stream in 66b format. In this view, a 66 bits block is reconstructed similar to the received data (see the screen capture below). The following columns are displayed in the **Raw Data View**:

- **Index**: This column demonstrates the index of the 66-bits symbol in current blocks.
- **Sync**: This column shows the Sync Header bits of a symbol.
- **Payload**: This column shows the 8 payload bytes in each symbol before scrambling.
- **Scrambled**: This column shows the 8 payload bytes in each symbol after scrambling.
- **FEC Payload**: This column shows the 8 payload bytes in each symbol after scrambling.
- **T**: This column shows the Transcode Bit of each FEC symbol.
- **PN-2112 scrambled**: This column shows the scrambled value of each 65-bits block with PN-2112 scrambler.
- **Parity bits**: This value (row) shows FEC parity bits of each FEC block.

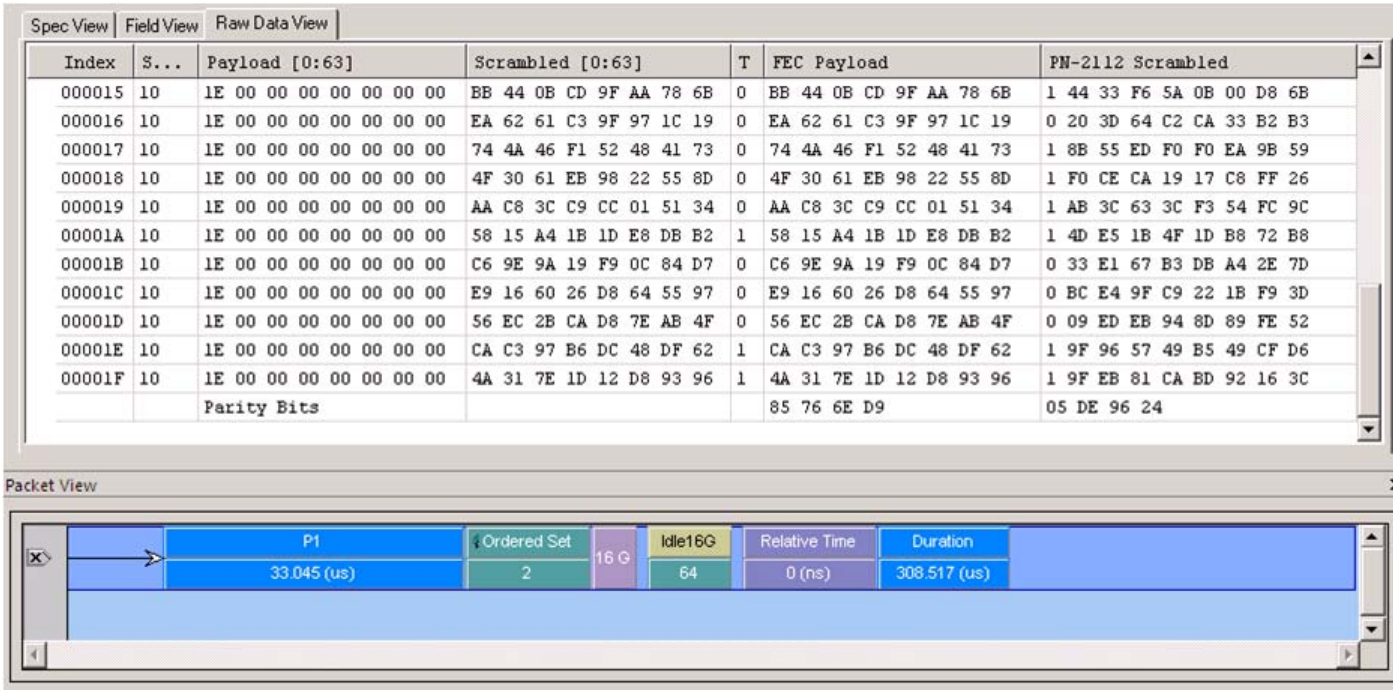


Figure 3.13: FC16 Raw Data View with FEC

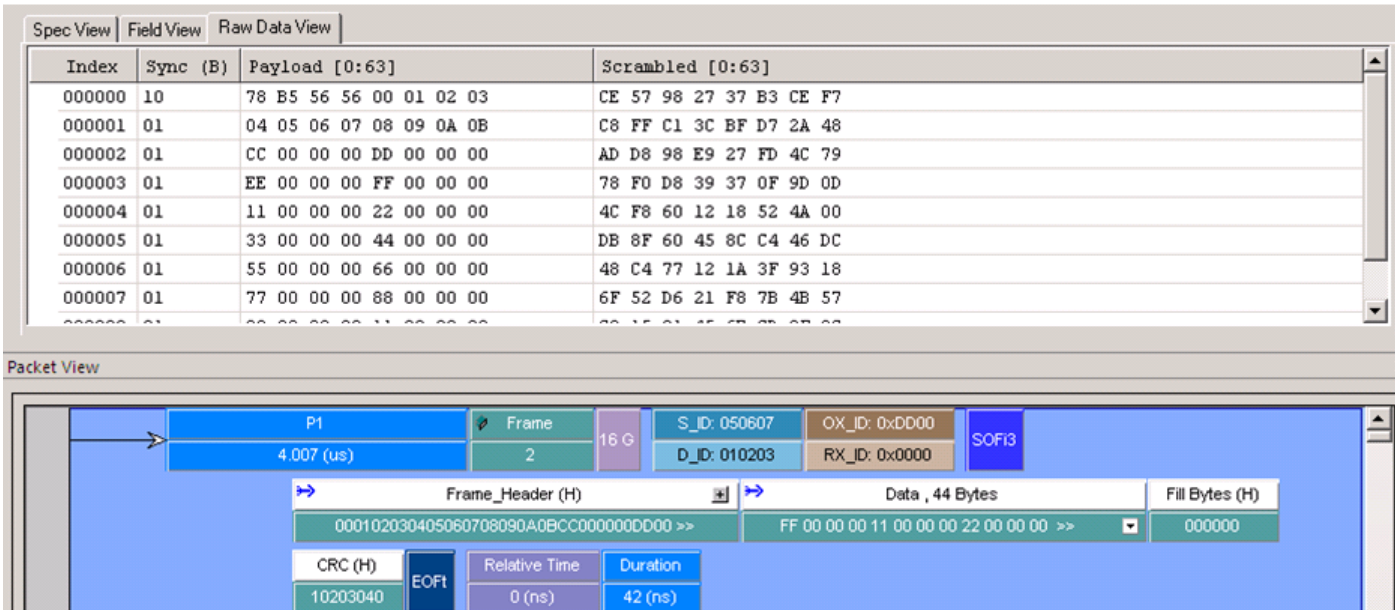


Figure 3.14: FC16 Raw Data View without FEC

Packet View

Packet View displays the captured data interpreted as packets in a hierarchical view.

To display the Packet View, select **View > Packet View** or click the button on the Show View Type toolbar.

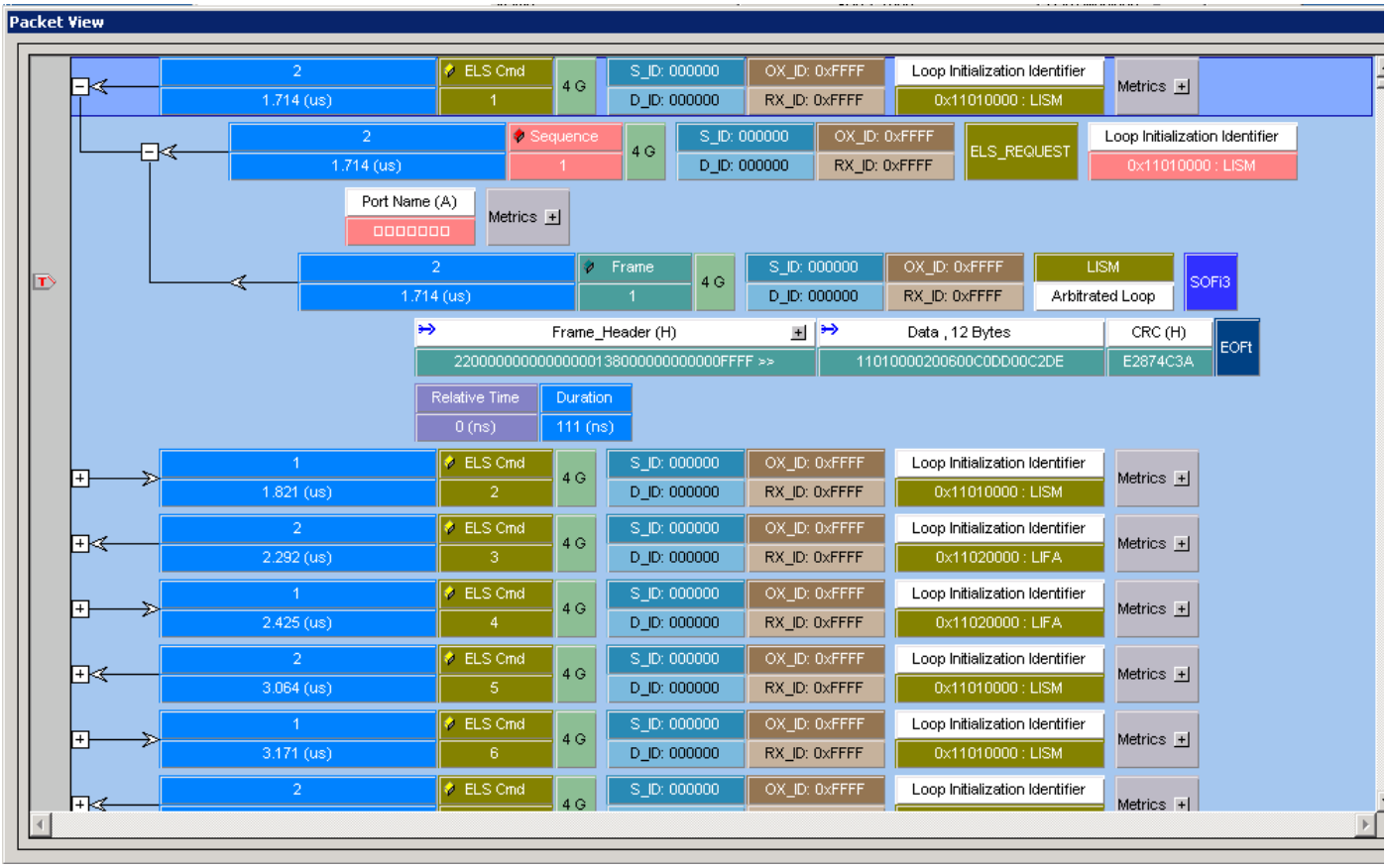


Figure 3.15: Packet View

Text View

Text View (Frame List View) displays the captured data interpreted as transaction frames, grouped in columns by port.

To display Text View, select **View > Text View** or click the button on the View Type toolbar.

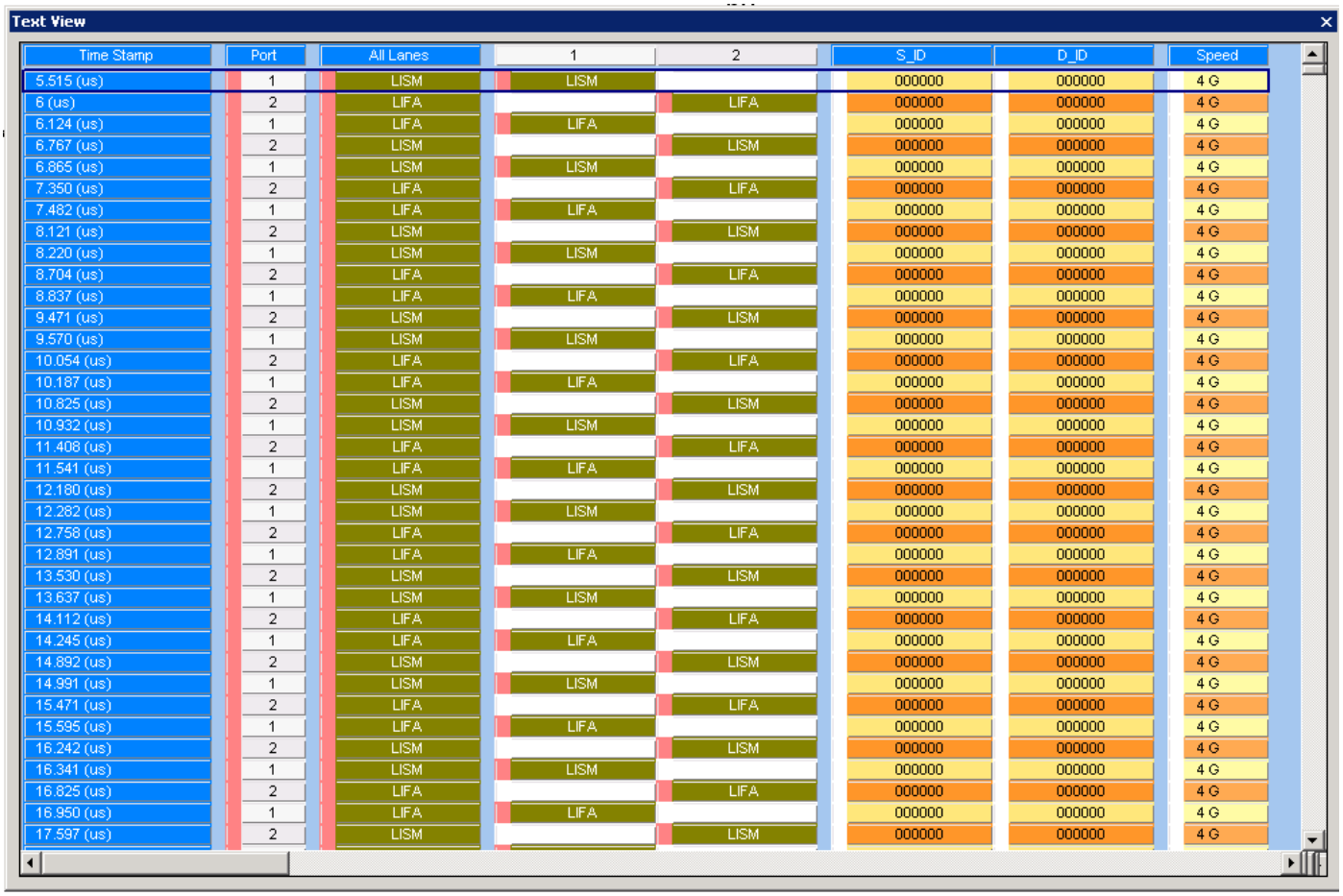
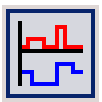


Figure 3.16: Text View

Bus Utilization View

The Bus Utilization View displays the bus utilization activity (see Figure 3.17 on page 195). You can select a graph area to view the bus utilization of that area.

To display Bus Utilization View, select **View > Bus Utilization** or click the  button on the Show View Type toolbar.

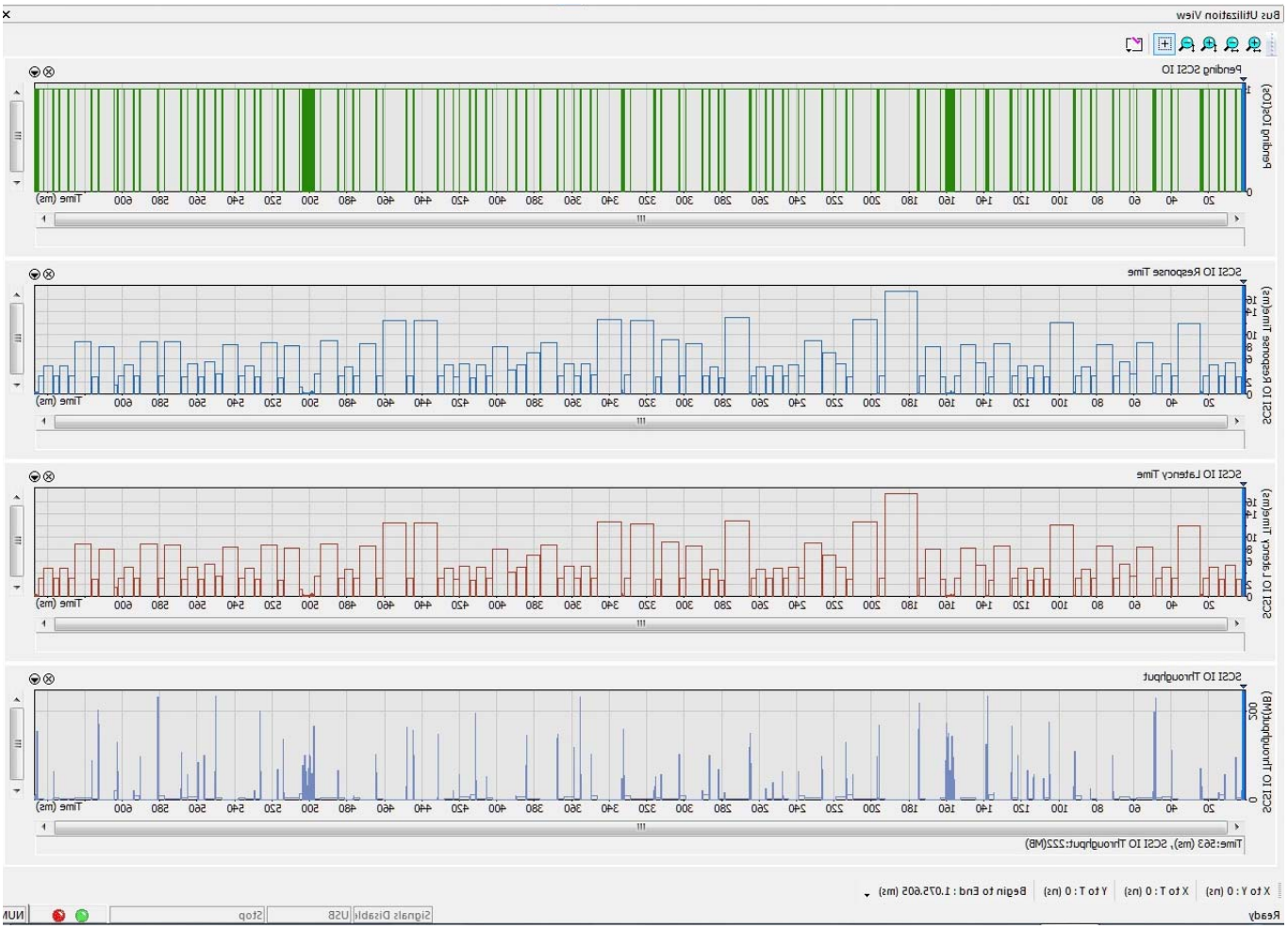


Figure 3.17: Bus Utilization View

Available Bus Utilization Views are:

- Pending SCSI IO
- SCSI IO Response Time
- SCSI IO Latency Time
- SCSI IO Throughput

Hovering the mouse over the graph heading displays the graph legend.

The available right-click commands are:

- **Go to SCSI Cmd. #**: Jump to command.
- **Synchronize with Trace View**: Synchronize all open views to that location in the trace.
- **Fit to Graph Area**: Zoom to fit.
- **Hide**: Do not display the graph.

To synchronize all open views to that location in the trace, double-click the graph.

Bus Utilization Buttons

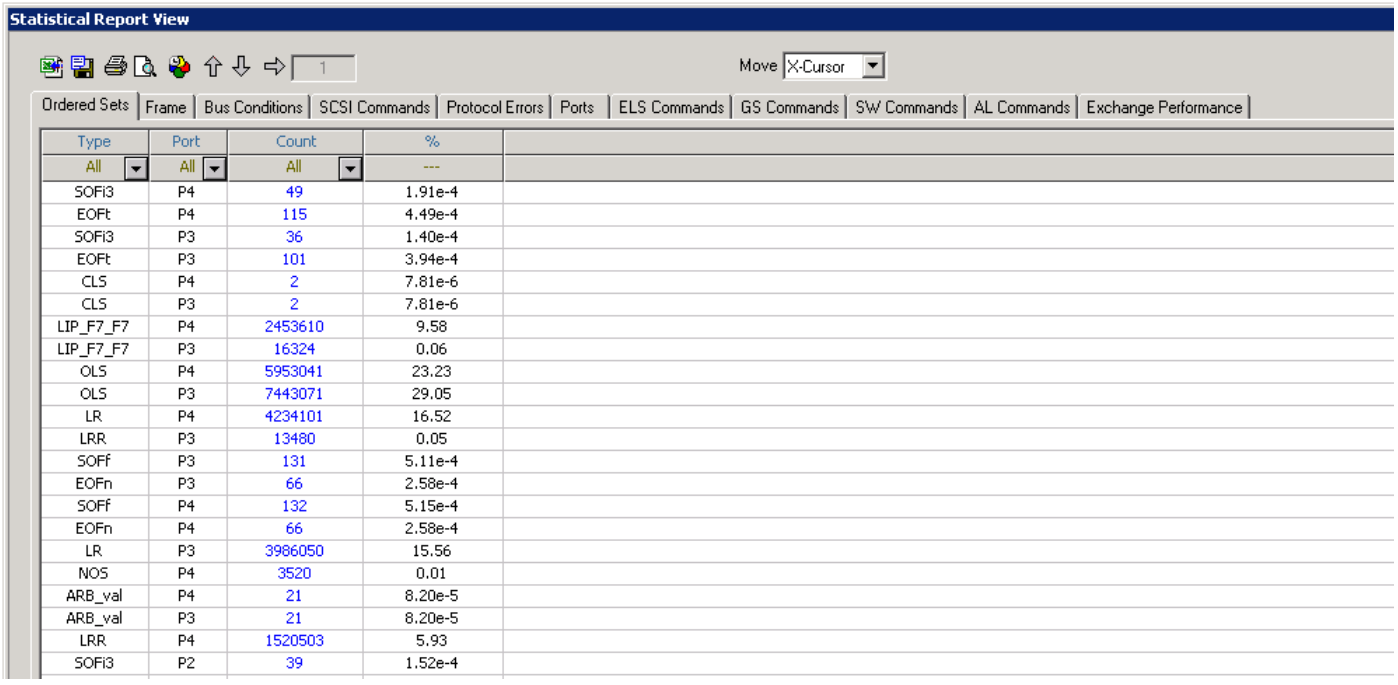
The Bus Utilization window has a row of buttons for changing the format of the displayed data. The buttons have the following functions:

	Horizontal zoom in		Vertical zoom in
	Horizontal zoom out		Vertical zoom out
	Graph Areas Presents options for displaying additional graphs.		Click and Drag zoom Click diagonally to select and zoom in on part of the graph.
	Hide graph.		Graph legend (see previous page)

Statistical Report View

Statistical Report View displays the statistics of the captured data. For additional information see “Statistical Report Toolbar” on page 222.

To display Statistical Report View, select **View > Statistical Report View** or click the button on the Show View Type toolbar.



Type	Port	Count	%
All	All	All	---
SOFi3	P4	49	1.91e-4
EOFt	P4	115	4.49e-4
SOFi3	P3	36	1.40e-4
EOFt	P3	101	3.94e-4
CLS	P4	2	7.81e-6
CLS	P3	2	7.81e-6
LIP_F7_F7	P4	2453610	9.58
LIP_F7_F7	P3	16324	0.06
OLS	P4	5953041	23.23
OLS	P3	7443071	29.05
LR	P4	4234101	16.52
LRR	P3	13480	0.05
SOFf	P3	131	5.11e-4
EOFn	P3	66	2.58e-4
SOFf	P4	132	5.15e-4
EOFn	P4	66	2.58e-4
LR	P3	3986050	15.56
NOS	P4	3520	0.01
ARB_val	P4	21	8.20e-5
ARB_val	P3	21	8.20e-5
LRR	P4	1520503	5.93
SOFi3	P2	39	1.52e-4

Figure 3.18: Statistical Report View

Customize Display

Show/Hide Port

You can simplify the viewer display by hiding the captures of ports. All active ports are highlighted on the Show/Hide Ports toolbar. Click a port button to hide the capture for that port.

Figure 3.19: Show/Hide Ports Toolbar

Show/Hide Field

You can simplify the Viewer display by hiding fields. Click the Filtering Setup button on the top toolbar. The Quick Filtering dialog displays. Select a packet from the dropdown menu and select **Show** or **Hide** to Show/Hide items as shown below.

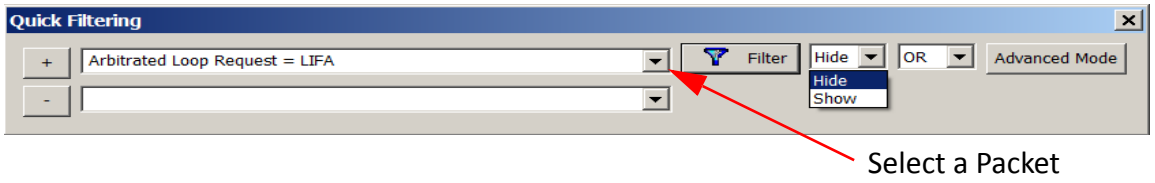


Figure 3.20: Show/Hide in Quick Filtering

Click on the **Advanced Mode** button to display the Filter dialog (see Figure 3.21 on page 198). Select the desired options to show/hide.

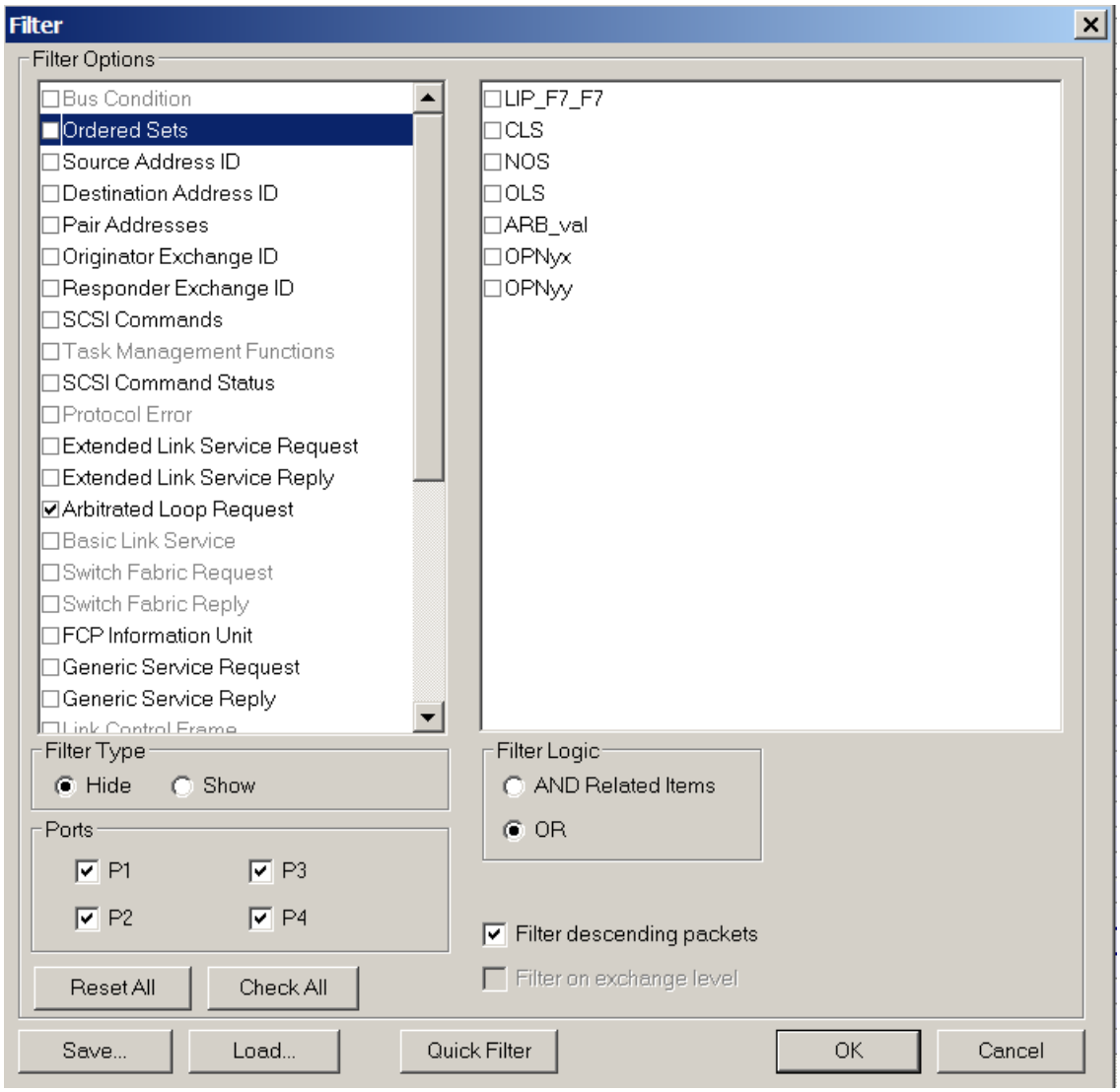


Figure 3.21: Show/Hide Field in Advanced Mode

Note: Only the fields previously hidden appear in the restore list.

Related Frames

Right-click a frame to open a short-cut menu, then choose **Goto** to jump to a related frame in the viewer.

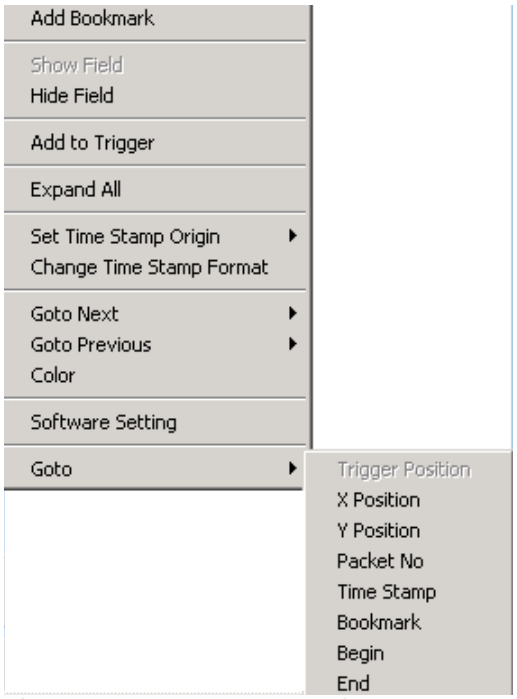


Figure 3.22: Goto Command

Choose Data Format

You can display data values either in hexadecimal (default) decimal, binary, name and ASCII. To choose data format, right-click the mouse over a data field, and choose **Format** and the format.

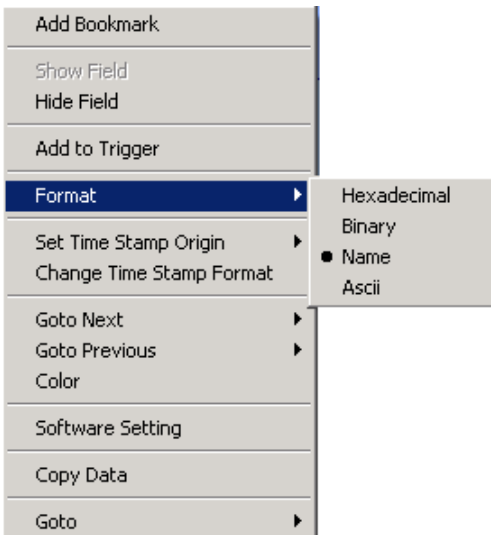


Figure 3.23: Format

Data Payload View

To display Data Payload dialog click on the **Data Payload** button in a data payload packet, (see Figure 3.24 on page 200).

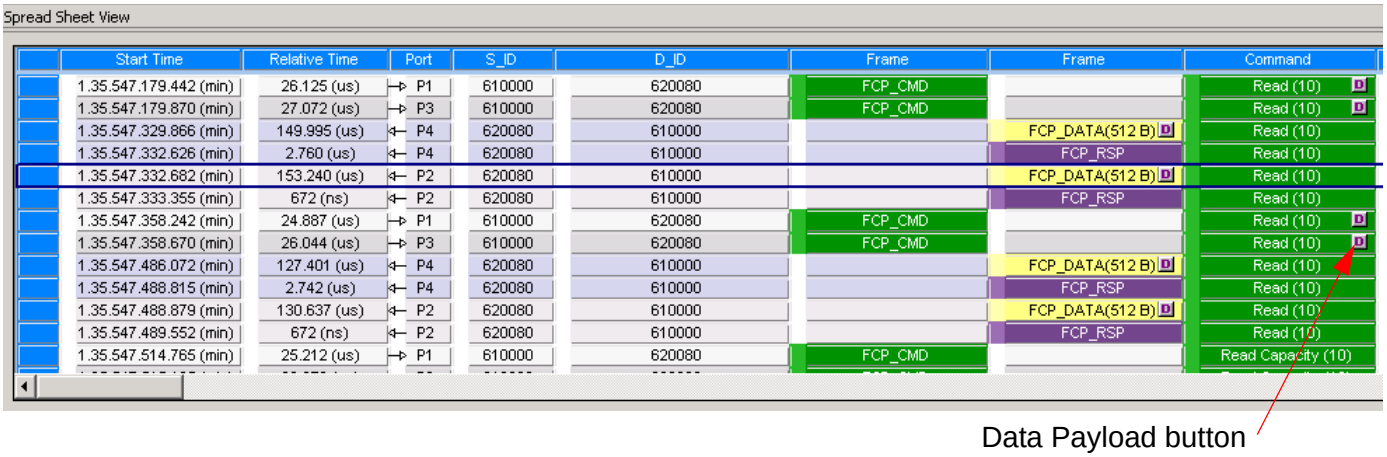
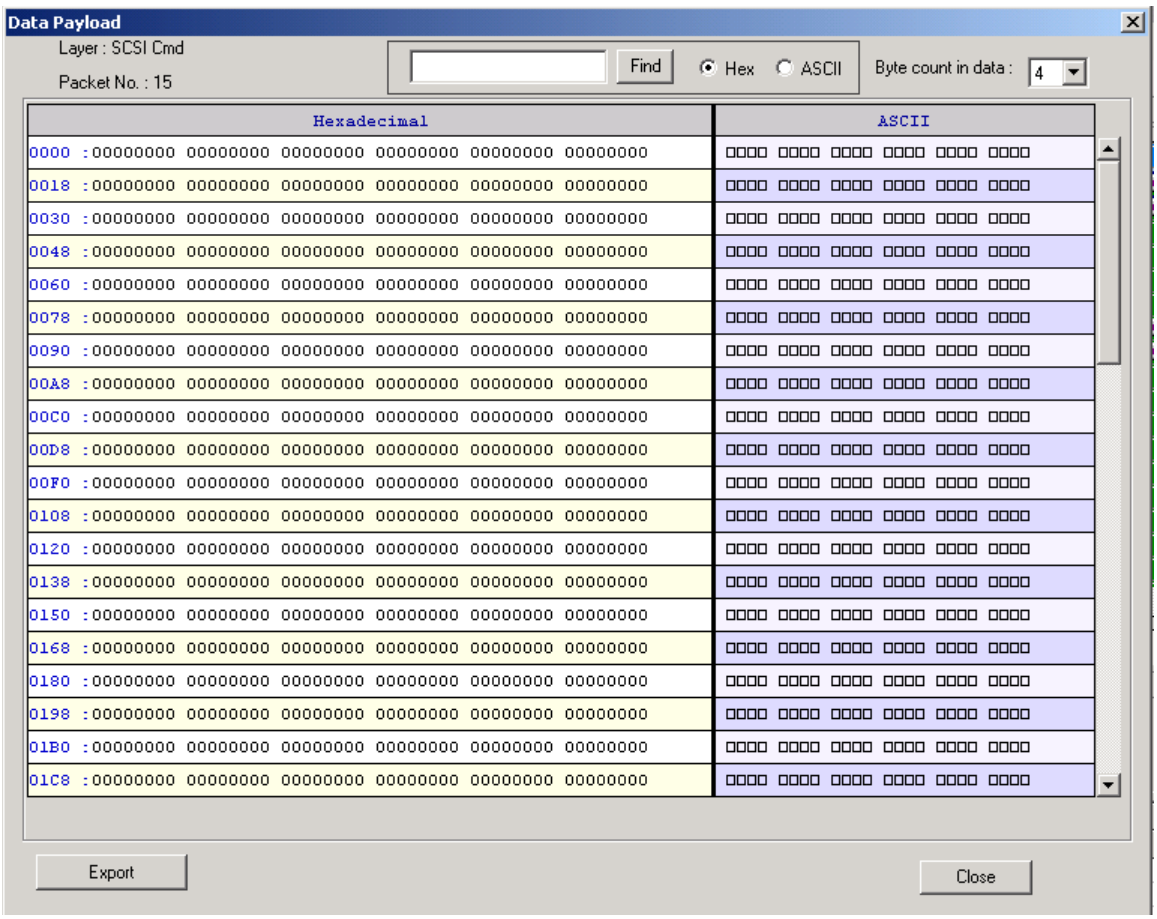


Figure 3.24: Data Payload Button Within the Data Payload Packet

The following Data Payload dialog displays.



Compare Two Data Payloads

To display data payloads, click the **Show compare 2 Data Payloads** icon on the toolbar. This icon is active only when two data payloads packets are selected (Figure 3.25).

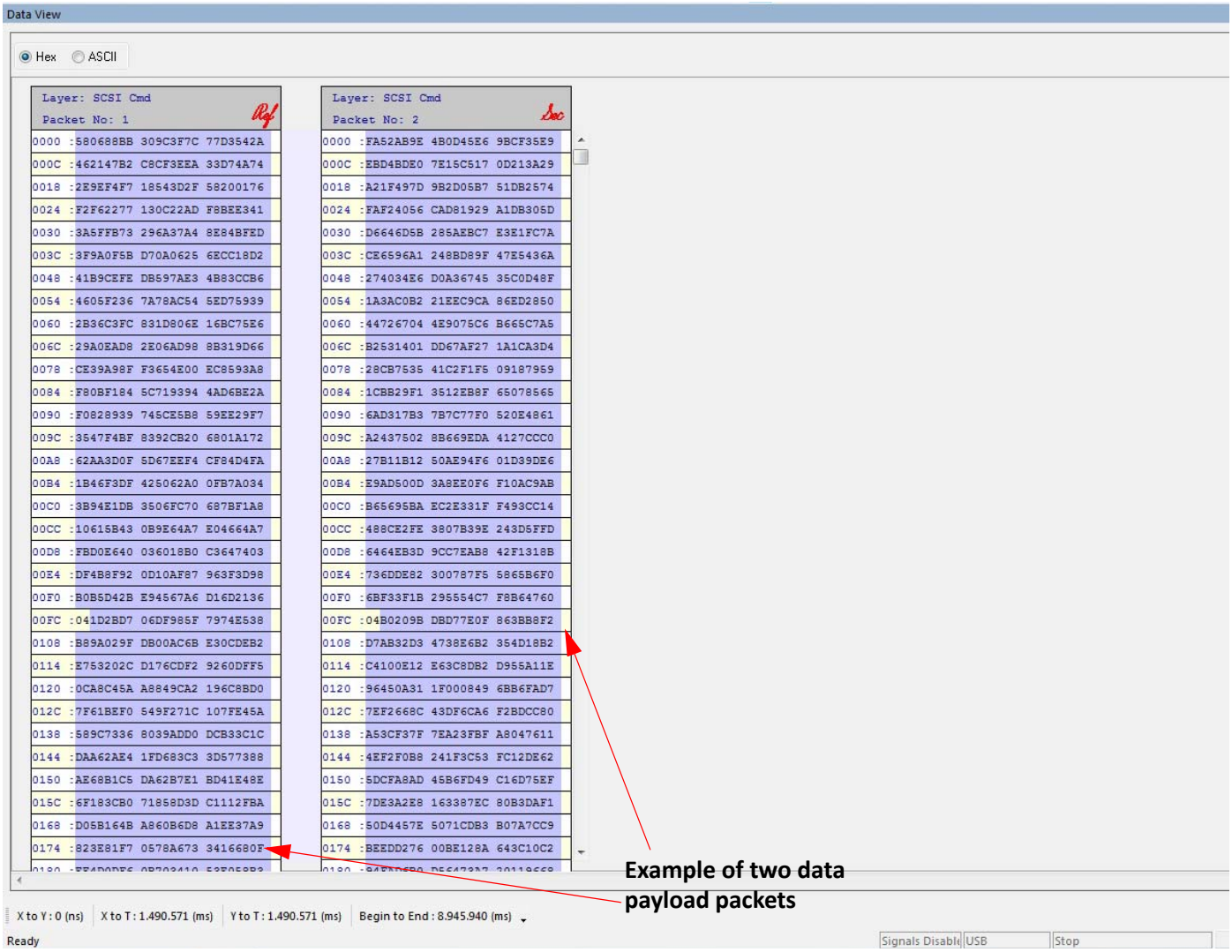


Figure 3.25: Two Data Payload Packets

To compare two data payloads, select two different payload packets, right-click and select one as **Set As Reference Data Payload** and select the other as **Set As Second Data Payload**. You can compare two data payloads in Packet View or a related frame in Text View or Spreadsheet View to display a menu.

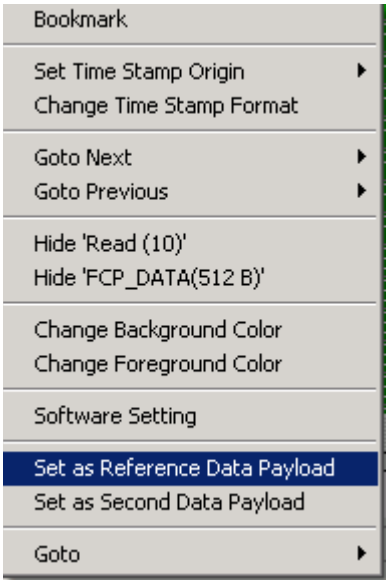


Figure 3.26: Set Reference and Second Data Payload Packets

Tile Horizontally All Views

You can use the **Tile Horizontally All Views** icon or select **View > Tile Views** to revert any unintended window docking or sizing, or maximize screen utilization. This function only tiles views inside a trace window.

Note: Note that there is no command to tile views vertically.

Verification Scripts

You can perform custom post-process analysis of the open trace by running a verification script over the trace. For more information, see “Running Verification Script Engine (VSE)” on page 227.

Port Status

You can get an overview of the active ports by clicking the **Port Status** button at the bottom right of the application window.

The Port Status displays the Port, Speed, and Function.

In addition to displaying Link, Frame, and Error, a display showing the% buffer full opens when a trigger occurs. The Error, Trigger and Buffer indicator columns are displayed only when recording (see Figure 3.27 on page 203).

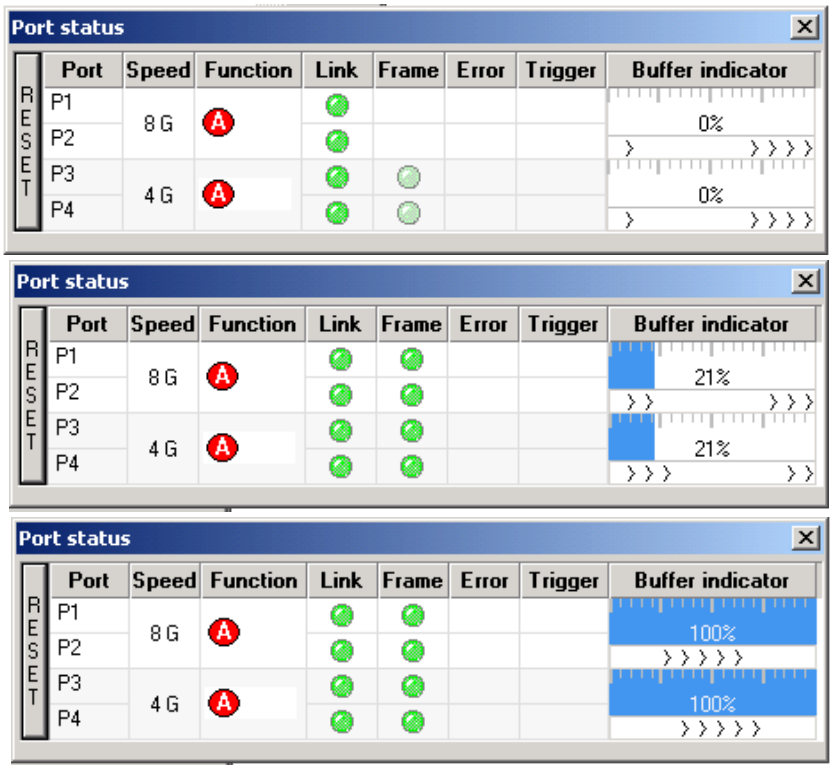


Figure 3.27: Port Status Window Displaying Buffer Indicator

Note: If sample capture occurs with more than one unit active, additional Port Status windows display.

Toolbars

Enabling Tool Bars

To customize the Viewer Display workspace, you can enable and reposition the available toolbars. To display or hide toolbars, select **View > Toolbars**, then check or uncheck toolbars**.**

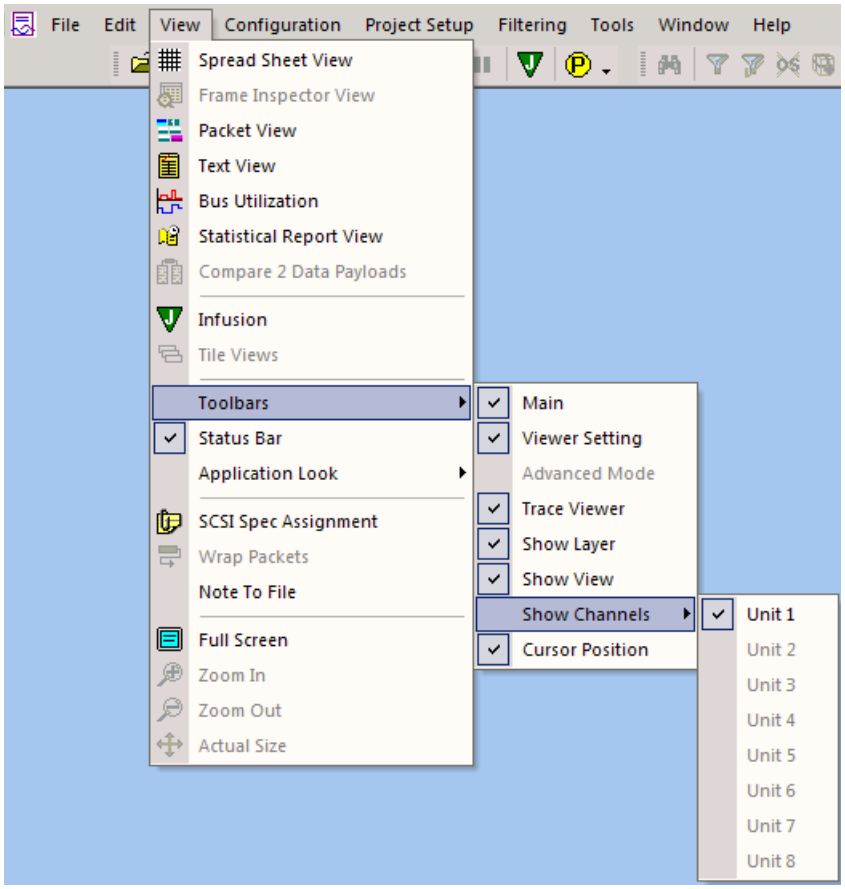


Figure 3.28: Customizing the Toolbar

Toolbars are:

- Main
- Viewer Setting
- Advance Mode
- Trace Viewer
- Show Layer
- Show View
- Show Channels (Unit 1, Unit2, and so on)
- Cursor Position
- Customize

Once enabled, the toolbars can dock at the Viewer Display window or float on the windows desktop.

Main Toolbar

See “Software Menus and Toolbar” on page 37.

Show View Type Toolbar

See “Switching Views” on page 185.

Trace Viewer Toolbar

The Trace Viewer toolbar allows searching, filtering, collapsing/expanding, and data reporting.

.

The **Search** button opens the search dialog (see “Quick Search” on page 239).

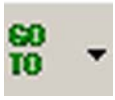
The **Filtering Setup** button opens the Quick Filter dialog (see “Quick Filtering” on page 231) and allows you to specify the criteria for filtering the result.

The **Enable Disable Filtering** button toggles the result between a filtered and unfiltered view (see “Quick Filtering” on page 231).

The **Hide All Ordered Sets** button hides all the ordered sets.

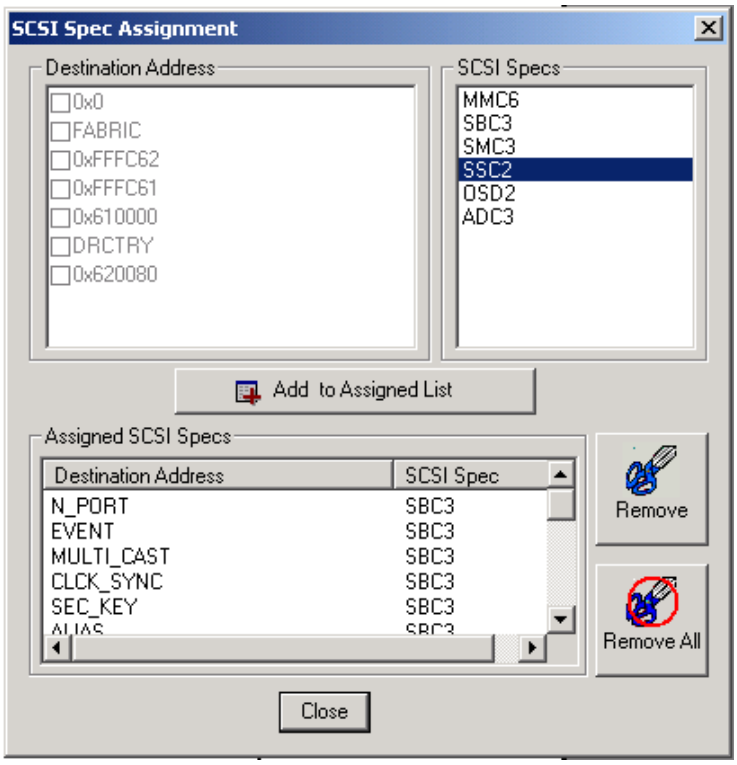
The **Pack Repeated Ordered Sets** button toggles packing repeated ordered sets in one port.

The **Expand/Collapse all Layers** button expands or collapses Transport and Application layers to simplify results display.



The down arrow on the **Go To** button allows location of cursors or specific packets: Trigger Position, X Position, Y Position, Packet Number, Timestamp, Bookmark, Begin, and End.

The **SCSI Spec Assignment** button displays the SCSI Spec Assignment dialog.



Viewer Setting Toolbar

The Viewer Setting toolbar allows wrapping, zooming, and configuration

The **Full Screen** button on the Viewer Setting Toolbar increases the data display area to the full screen.

The **Zoom In** button on the Viewer Setting Toolbar magnifies the data display area on the screen. Clicking this button in Column or Text View increases column width only.

The **Zoom Out** button on the Viewer Setting Toolbar scales the data display area to display more data lines on the screen. Clicking this button in Column or Text View decreases column width only.

The **Normal Zoom** button on the Viewer Setting Toolbar resets the zoom to default normal on the screen. Clicking this button in Column or Text View resets column width only.

The **Wrap Packets** button on the Viewer Toolbar wraps the packet data in the display to eliminate the need for horizontal scrolling.

The **View Setting** button on the Viewer Setting Toolbar opens the Sample Viewer Configuration dialog (see "Viewer Configuration" on page 244).

Cursor Position Status Bar

To display the cursor position status bar, select **View>Toolbars > Cursor Position**.

Figure 3.29: Cursor Position Toolbar

See "Using Cursors and Bookmarks" on page 235.

Show Layer Toolbar

The Show Layer toolbar shows or hides packet types.

The **Show/Hide Frame Packets** button displays/hides the frame packets layer.

The **Show/Hide Sequence Packet** button displays/hides the sequence packet.

The **Show/Hide All of Commands Packet** button shows/hides the Command layer and all layers below.

The **Order/Reorder Packets based on Time** button toggles the time order of packets.

Status Bar

The Status bar is located at the bottom of the main display window. Depending on the current activity, the bar can be divided into as many as four segments.

Recording Progress

When you begin recording, the left-most segment of the Status Bar displays a Recording Progress Indicator.

As recording progresses, the Progress Indicator changes to reflect the recording progress graphically:

In the Progress Indicator, a black vertical line illustrates the location of the Trigger Position you selected in Recording Options.

- Pre-Trigger progress is displayed in the field to the left of the Trigger Position in the before-Trigger color specified in the Display Options.
- When the Trigger Position is reached, the progress indicator wiggles as it waits for the trigger.
- After the trigger occurs, the field to the right of the Trigger Position fills in the after-Trigger color specified in the Display Options.
- When recording is complete, the upper half of the progress indicator fills in white, indicating the progress of the data upload to the host machine.

You should be aware of two exceptional conditions:

- If a Trigger Event occurs during the before-Trigger recording, the before-Trigger color changes to the after-Trigger color to indicate that not all the expected data was recorded pre-Trigger.
- When you click **Stop** before or after a Trigger Event, the Progress Bar adjusts accordingly to begin uploading the most recently recorded data.

The Progress Bar fills with color in proportion to the specified size and actual rate at which the hardware is writing and reading the recording memory. However, the Progress Indicator is normalized to fill the space within the Status Bar.

Recording Status

During recording, the current Recording Status is displayed in the next segment. When you activate the **Record** function, this segment flashes one of the following messages (depending on the selected Recording Options):

- Trigger?
- Triggered!
- Uploading

After recording stops,

- The flashing message changes to **Uploading data–*x*% done** (x% indicates the percentage completion of the data uploading process).
- The traffic data is copied to disk (overwriting any previous version of this file) using the default file name **data[sn].fcs** where [sn] is the serial number of the analyzer chassis; or the name you assign as the default filename. You can also create a file name of your choice by specifying one in the Recording Options dialog box.

To abort the upload process:

- Press **Esc** on your keyboard

OR

- Again click in the Toolbar.

You are asked if you want to keep or discard the partially uploaded data.

When the data is saved, the Recorded Data file appears in the main display window and the Recording Status window is cleared.

- If the recording resulted from a Trigger Event, the first packet following the Trigger (or the packet that caused the Trigger) is initially positioned second from the top of the display.
- If the recording did not result from a Trigger Event, the display begins with the first packet in the traffic file.

Recording Activity

During recording, the fourth segment from the left of the Status Bar displays Recording activity as a series of vertical bars.

The more vertical bars that are displayed, the greater the amount of activity being recorded. If there are no vertical bars, there is no recorded activity.

During uploading, the percent of the completed upload is displayed.

Note: If packets are filtered from the recording or data are truncated, the recording activity is reduced.

Search Status

The right most segment displays the current search direction: **Fwd** (forward) or **Bwd** (backward). Change the search direction from the Search Menu or double-click the Search Status segment.

Statistical Report

Whenever a captured sample is in the Trace Viewer, a **Statistical Report** selection in the **Report** menu and a **Statistical Report Button** on the viewer toolbar are enabled. You can create a Statistical Report for the entire capture or select a portion of it.

To display a Statistical Report, click the **Statistical Report** button on the viewer toolbar or select **View > Statistical Report** View to display the Select Statistical Report Range dialog.

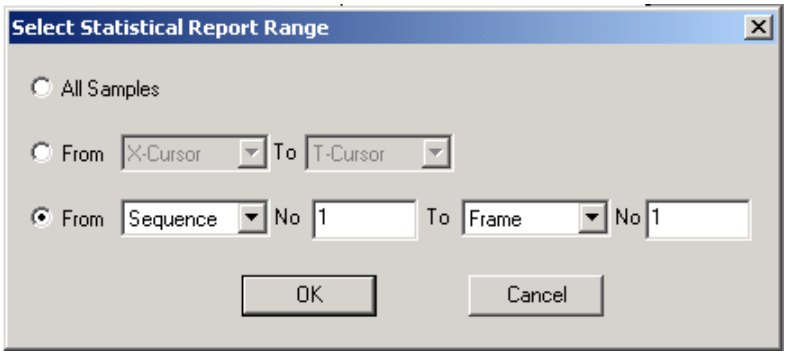


Figure 3.30: Statistical Report Range Dialog

The default statistical report has All Samples. You can set a specific Statistical report range between defined cursor positions or Events.

Report between Cursors

Click the option button next to the **From** cursor selection drop down list. Then click the **From** down arrow and choose the 1st cursor, click the **To** down arrow to choose the 2nd cursor, and click **OK.** The resulting report has only the capture between the cursors.

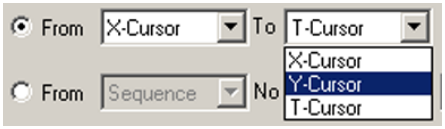


Figure 3.31: Report between Cursors

Report between Events

Click the option button next to the **From** the Event selection dropdown list, click the **From** down arrow to choose the 1st Event, then enter the number of its occurrence. Next click the **To** down arrow to choose the 2nd Event, then enter the number of its occurrence.

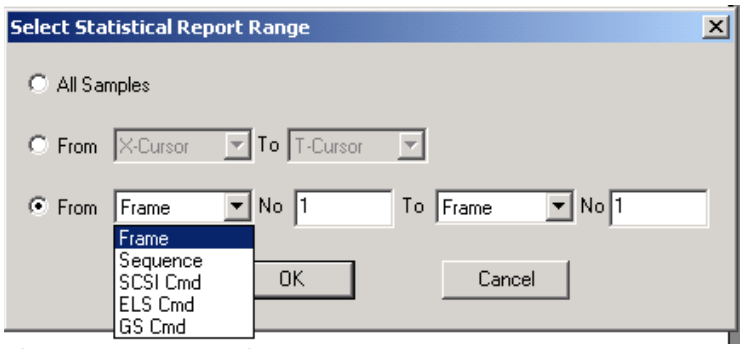


Figure 3.32: Report between Events

Click **OK.** The resulting report are limited to the capture between the defined Events.

Statistical Report Content

A complete statistical report consists of the following reports, accessed by clicking the corresponding tab in the dialog. The Bus Conditions and Protocol Errors tabs appear only if there are any changes to the bus condition in the trace or if there are any protocol errors.

- Ordered Sets
- Frame
- Bus Conditions
- SCSI Commands
- Protocol Errors
- Ports
- Pending IO
- ELS Commands
- GS Commands
- AL Commands
- Exchange Performance

Note: Results are displayed only for items that have been captured in the sample.

The data in the Statistical Report can be sorted in ascending or descending order by clicking on the column header.

Report Options

Some report categories offer options to display only specific items.These report categories incorporate drop-down list boxes offering pre-defined and custom options. For details see “Formatting the Statistical Report View” on page 225.

Ordered Sets

To display the Ordered Sets, click the **Ordered Sets** tab. The Ordered Sets Report displays report data shown in the following screen shot. The report displays the following information:

- **Type:** All, Custom, SOFn3, EOFn, EOFt, SOFi3
- **Port**: The ports that are selected
- **Count**: All, Custom, or a number of occurrences
- **%:** Percent of total count

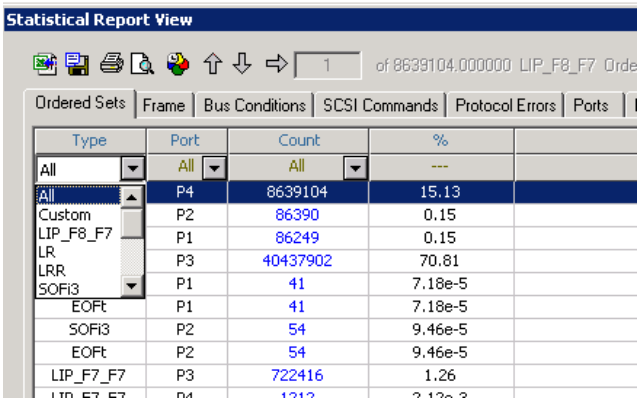


Figure 3.33: Ordered Sets Statistical Report View

Frame Report

To display the Frame Report, click the **Frame** tab (see Figure 3.34 on page 213). The report gives the statistics of the frame. The following information is displayed in this report:

- **Port**: The ports that are selected
- **Source ID**: All, Custom and other
- **Destination ID**: All, Custom and other
- **Type**: Select from the dropdown list
- **Count**: All, Custom, or a number of occurrences
- **%**: Percent of total count

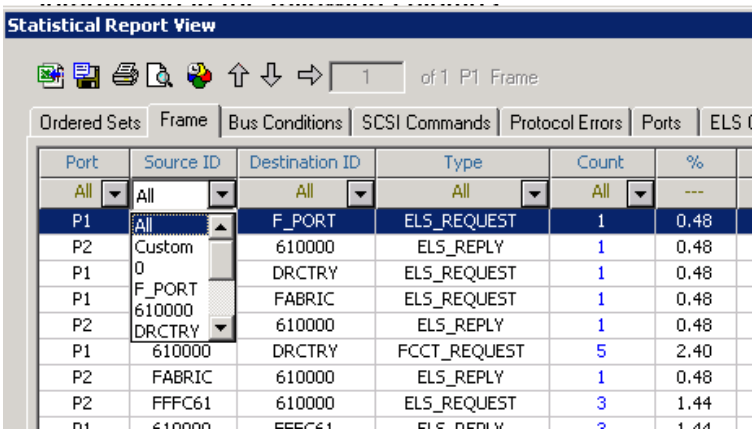


Figure 3.34: Frame Statistical Report

Bus Conditions Report

To display the Bus Conditions Report, click the **Bus Conditions** tab. The Bus Conditions Report displays the conditions of the bus. The following information is displayed in this report:

- **Port**: The ports that are selected
- **Type:** All, Custom, Disconnect, Connect
- **Count**: All, Custom, or a number of occurrences
- **%:** of total count

Note: The Bus Conditions tab appears only if there are any changes to the bus condition in the trace.

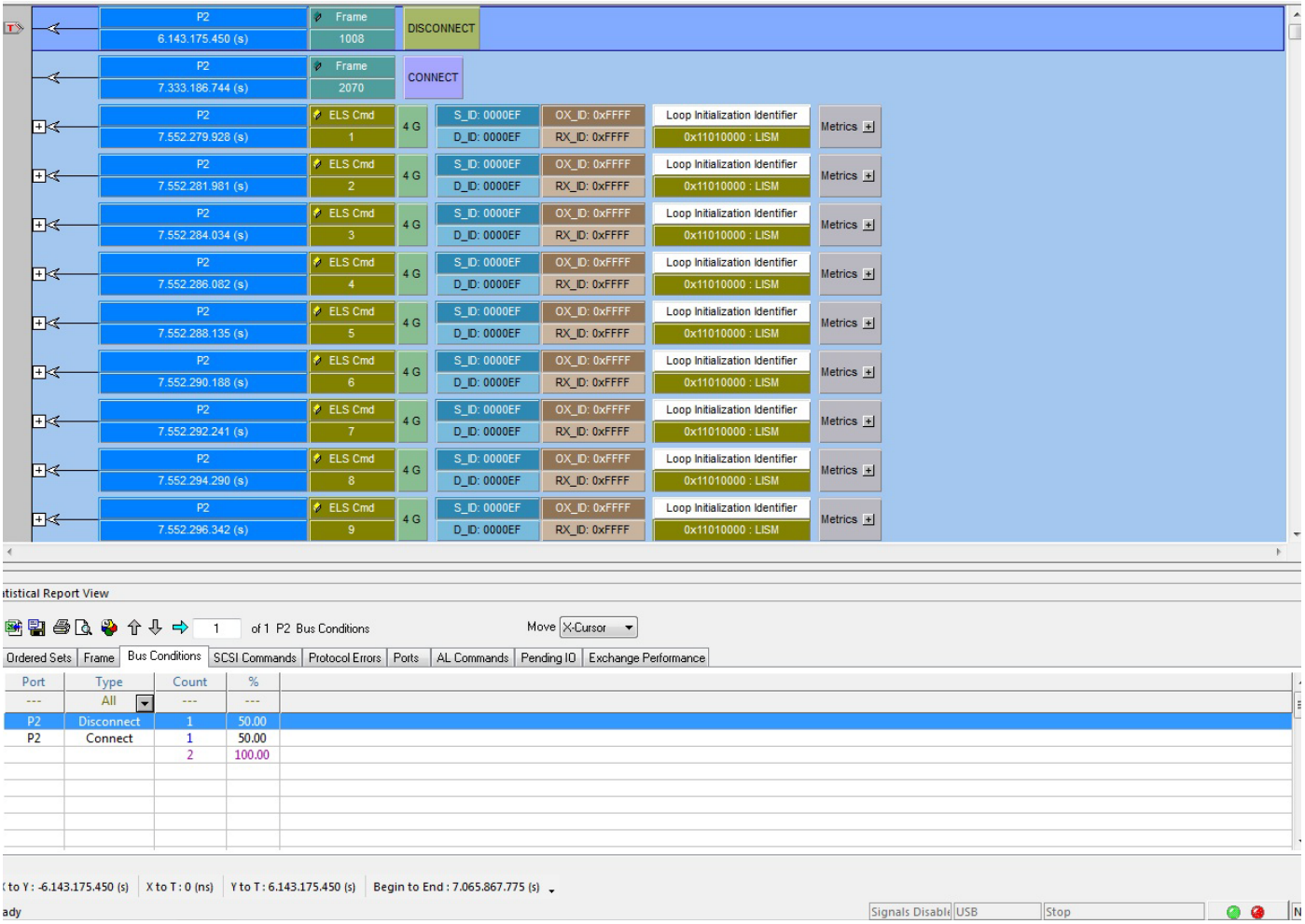
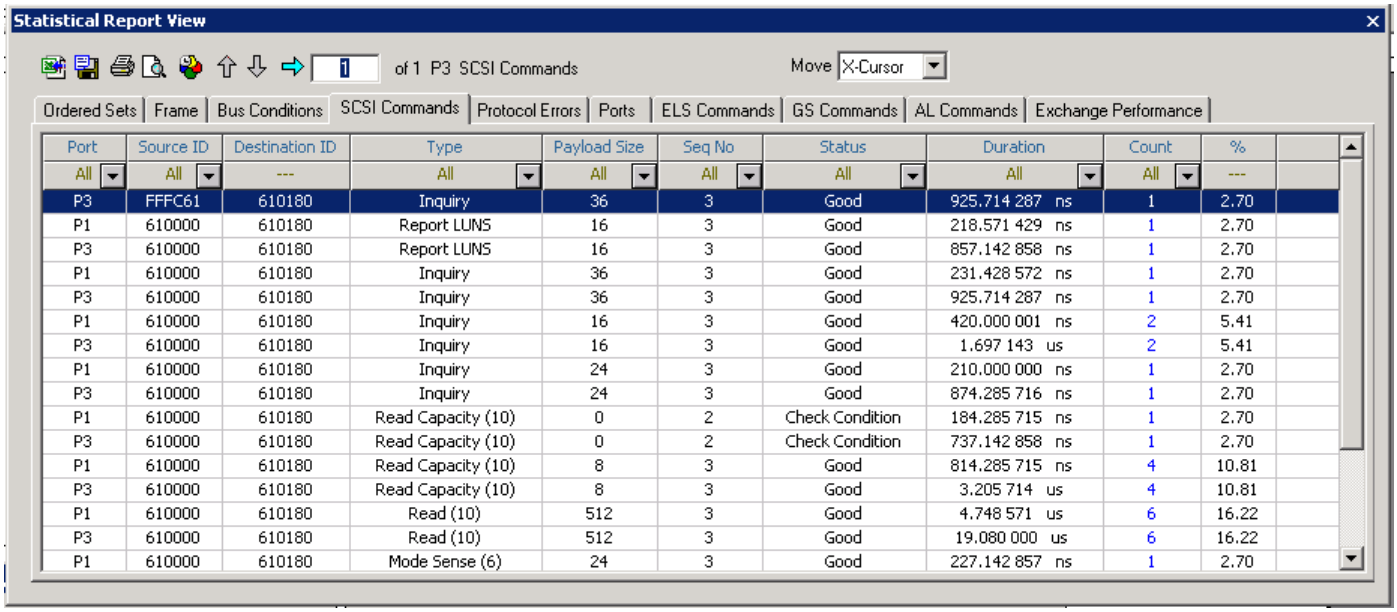


Figure 3.35: Bus Conditions Statistical Report

SCSI Commands Report

To display the SCSI Command Report, click the **SCSI Command** tab. The SCSI Command Report displays data shown in the screen capture below. The following information is displayed in this report:

- **Port**: The ports that are selected
- Source ID
- Destination ID
- **Type**: All, Custom, Report LUNs, Inquiry, Read Capacity (10), Read (10), Mode Sense (6)
- **Payload Size**: All, Custom, or a number of Dwords
- **Seq No**: All, Custom and other
- **Status**: All, Custom, Good, Check Condition
- **Duration**: All, Custom and other
- **Count**: All, Custom, or a number
- **%**: of total count



Port	Source ID	Destination ID	Type	Payload Size	Seq No	Status	Duration	Count	%
All	All	---	All	All	All	All	All	All	---
P3	FFFC61	610180	Inquiry	36	3	Good	925.714 287 ns	1	2.70
P1	610000	610180	Report LUNS	16	3	Good	218.571 429 ns	1	2.70
P3	610000	610180	Report LUNS	16	3	Good	857.142 858 ns	1	2.70
P1	610000	610180	Inquiry	36	3	Good	231.428 572 ns	1	2.70
P3	610000	610180	Inquiry	36	3	Good	925.714 287 ns	1	2.70
P1	610000	610180	Inquiry	16	3	Good	420.000 001 ns	2	5.41
P3	610000	610180	Inquiry	16	3	Good	1.697 143 us	2	5.41
P1	610000	610180	Inquiry	24	3	Good	210.000 000 ns	1	2.70
P3	610000	610180	Inquiry	24	3	Good	874.285 716 ns	1	2.70
P1	610000	610180	Read Capacity (10)	0	2	Check Condition	184.285 715 ns	1	2.70
P3	610000	610180	Read Capacity (10)	0	2	Check Condition	737.142 858 ns	1	2.70
P1	610000	610180	Read Capacity (10)	8	3	Good	814.285 715 ns	4	10.81
P3	610000	610180	Read Capacity (10)	8	3	Good	3.205 714 us	4	10.81
P1	610000	610180	Read (10)	512	3	Good	4.748 571 us	6	16.22
P3	610000	610180	Read (10)	512	3	Good	19.080 000 us	6	16.22
P1	610000	610180	Mode Sense (6)	24	3	Good	227.142 857 ns	1	2.70

Figure 3.36: SCSI Command Report

Protocol Errors Report

To display the Protocol Errors Report, click the **Protocol Errors** tab.The Protocol Errors Report displays the protocol error data (see Figure 3.37 on page 216.) The following information is displayed in this report:

- **Port**: The ports that are selected
- **Type**: All, Custom, Symbol Violation, Disparity Error, Primitive Error
- **Count**: All, Custom, or other
- **%:** of total count

Note: The Protocol Errors tab appears only if there are any protocol errors in the trace.

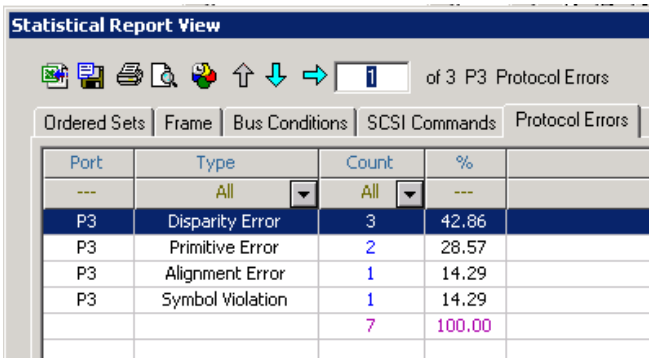


Figure 3.37: Protocol Errors Report

Ports Report

To display the Ports Report, click the **Ports** tab.The Ports Report displays data of the ports. The following information is displayed in this report:

- **Port**: The ports that are selected
- SCSI Count
- ELS Count
- GS Count
- SW Count
- AL Count
- Incomplete Count
- Total XFer
- Utilization
- Utilization **%**

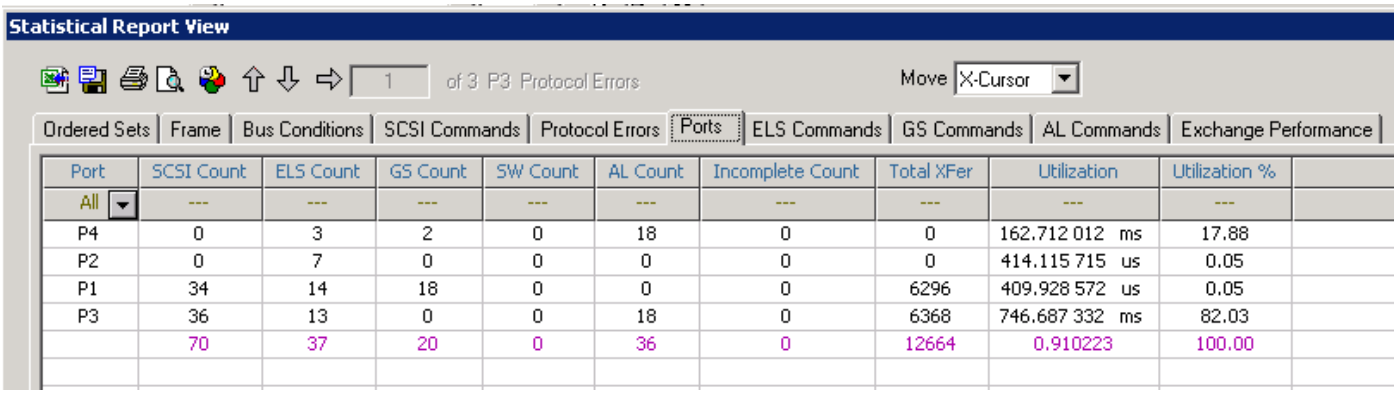

Statistical Report View
1
of 3 P3 Protocol Errors
Move X-Cursor
Ordered Sets
Frame
Bus Conditions
SCSI Commands
Protocol Errors
Ports
ELS Commands
GS Commands
AL Commands
Exchange Performance
Port SCSI Count ELS Count GS Count SW Count AL Count Incomplete Count Total XFer Utilization Utilization %
All
P4 0 3 2 0 18 0 0 162.712 012 ms 17.88
P2 0 7 0 0 0 0 0 414.115 715 us 0.05
P1 34 14 18 0 0 0 6296 409.928 572 us 0.05
P3 36 13 0 0 18 0 6368 746.687 332 ms 82.03
70 37 20 0 36 0 12664 0.910223 100.00

Figure 3.38: Ports Report

Pending IO Report

To display the Pending IO Report, click the **Pending IO** tab.The Pending IO Report displays data of the pending IOs. The following information is displayed in this report:

- **Port**: The ports that are selected
- Pending IO
- Max. Pending IO
- Avg. Pending IO

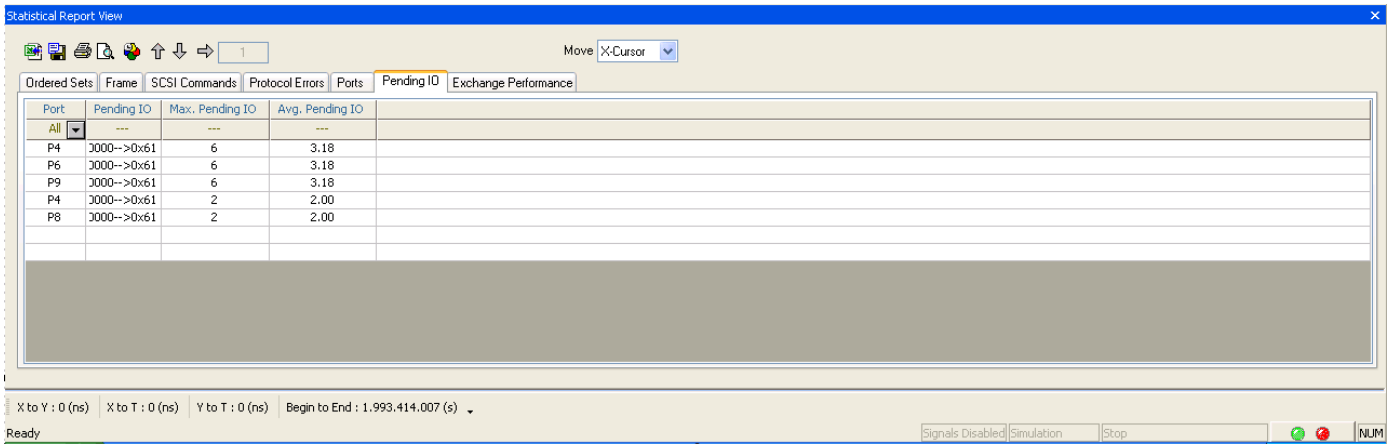
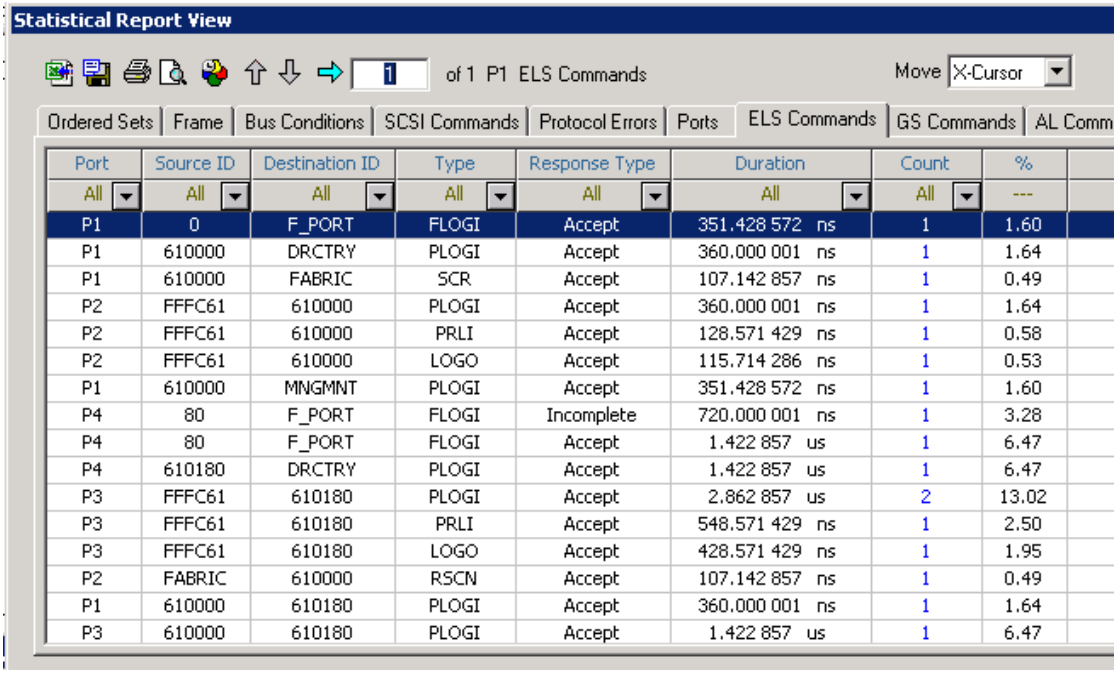


Figure 3.39: Pending IO Report

ELS Commands

To display the ELS Commands Report, click the **ELS Commands** tab. The ELS Commands Report displays the ELS Commands data. The following information is displayed in this report:

- **Port**: The ports that are selected
- **Source ID**: All, Custom, FABRIC, and other
- **Destination** ID: All, Custom Fabric and other
- **Type**: All, Custom, and other
- **Response Type**: All, Custom, Accept and Incomplete
- **Duration**: All, Custom and other
- **Count**: All, Custom, or a number of occurrences
- **%**: Percent of total count



Port	Source ID	Destination ID	Type	Response Type	Duration	Count	%
All	All	All	All	All	All	All	---
P1	0	F_PORT	FLOGI	Accept	351.428 572 ns	1	1.60
P1	610000	DRCTRY	PLOGI	Accept	360.000 001 ns	1	1.64
P1	610000	FABRIC	SCR	Accept	107.142 857 ns	1	0.49
P2	FFFC61	610000	PLOGI	Accept	360.000 001 ns	1	1.64
P2	FFFC61	610000	PRLI	Accept	128.571 429 ns	1	0.58
P2	FFFC61	610000	LOGO	Accept	115.714 286 ns	1	0.53
P1	610000	MNGMNT	PLOGI	Accept	351.428 572 ns	1	1.60
P4	80	F_PORT	FLOGI	Incomplete	720.000 001 ns	1	3.28
P4	80	F_PORT	FLOGI	Accept	1.422 857 us	1	6.47
P4	610180	DRCTRY	PLOGI	Accept	1.422 857 us	1	6.47
P3	FFFC61	610180	PLOGI	Accept	2.862 857 us	2	13.02
P3	FFFC61	610180	PRLI	Accept	548.571 429 ns	1	2.50
P3	FFFC61	610180	LOGO	Accept	428.571 429 ns	1	1.95
P2	FABRIC	610000	RSCN	Accept	107.142 857 ns	1	0.49
P1	610000	610180	PLOGI	Accept	360.000 001 ns	1	1.64
P3	610000	610180	PLOGI	Accept	1.422 857 us	1	6.47

Figure 3.40: ELS Commands Report

GS Commands

To display the GS Commands Report, click the **GS Commands** tab. The following information is displayed in this report:

- **Port**: The ports that are selected
- **Source ID**: All, Custom, and other
- **Destination ID**: All, Custom, and other
- **Type**: All, Custom, Management Service, Directory Service
- **SubType**: All, Custom, Fabric Device Management Interface, Unzoned Name Server, Name Server, Fabric Configuration Server
- **Command Code**: All, Custom, FETCH, and other
- **Response Type**: All, Custom, Reject and Accept
- **Duration**: All, Custom and other
- **Count**: All, Custom, or a number of occurrences
- %: Percent of total count

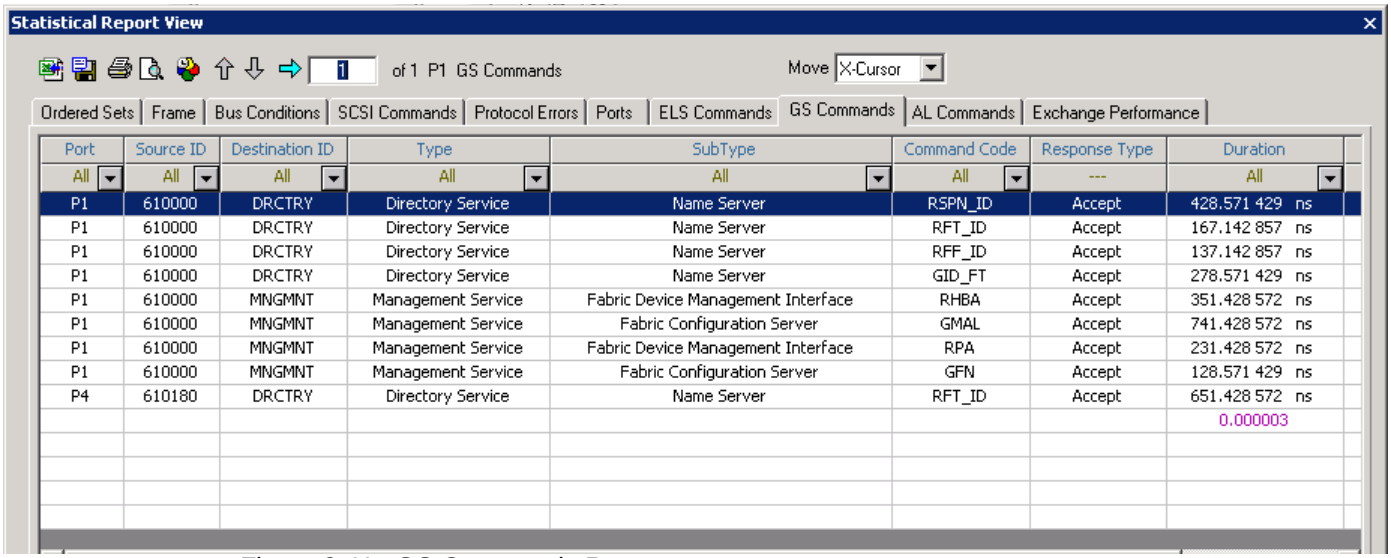
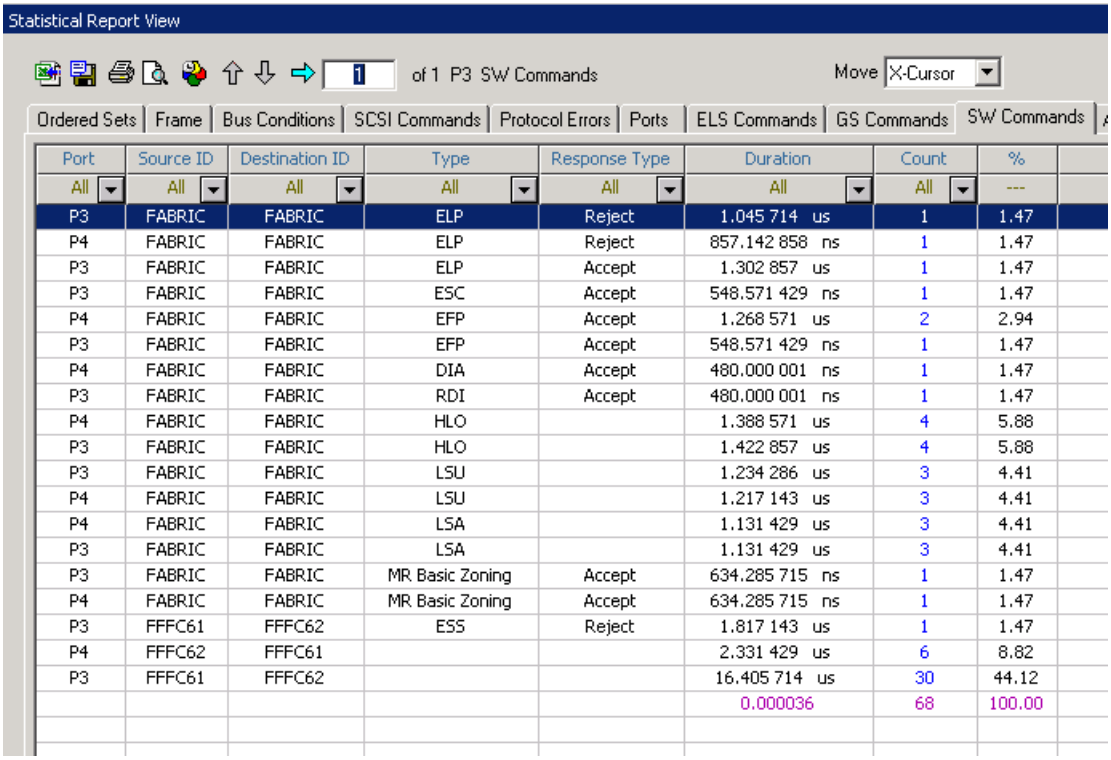

Statistical Report View
1
of 1 P1 GS Commands
Move X-Cursor
Ordered Sets
Frame
Bus Conditions
SCSI Commands
Protocol Errors
Ports
ELS Commands
GS Commands
AL Commands
Exchange Performance
Port
Source ID
Destination ID
Type
SubType
Command Code
Response Type
Duration
P1 610000 DRCTRY Directory Service Name Server RSPN_ID Accept 428.571 429 ns
P1 610000 DRCTRY Directory Service Name Server RFT_ID Accept 167.142 857 ns
P1 610000 DRCTRY Directory Service Name Server RFF_ID Accept 137.142 857 ns
P1 610000 DRCTRY Directory Service Name Server GID_FT Accept 278.571 429 ns
P1 610000 MNGMNT Management Service Fabric Device Management Interface RHBA Accept 351.428 572 ns
P1 610000 MNGMNT Management Service Fabric Configuration Server GMAL Accept 741.428 572 ns
P1 610000 MNGMNT Management Service Fabric Device Management Interface RPA Accept 231.428 572 ns
P1 610000 MNGMNT Management Service Fabric Configuration Server GFN Accept 128.571 429 ns
P4 610180 DRCTRY Directory Service Name Server RFT_ID Accept 651.428 572 ns
0.000003

Figure 3.41: GS Commands Report

SW Commands

To display the SW Commands Report, click the **SW Commands** tab. The following information is displayed in this report:

- **Port**: All, Custom and ports that are selected
- **Source ID**: All, Custom, FABRIC and other
- **Destination ID**: All, Custom, FABRIC and other
- **Type**: All, Custom and other
- **SubType**: All, Custom, Fabric Device Management Interface, Unzoned Name Server, Name Server, Fabric Configuration Server
- **Command Code**: All, Custom, FETCH, and other
- **Response Type**: All, Custom, Reject and Accept
- **Duration**: All, Custom and other
- **Count**: All, Custom, or a number of occurrences
- %: Percent of total count



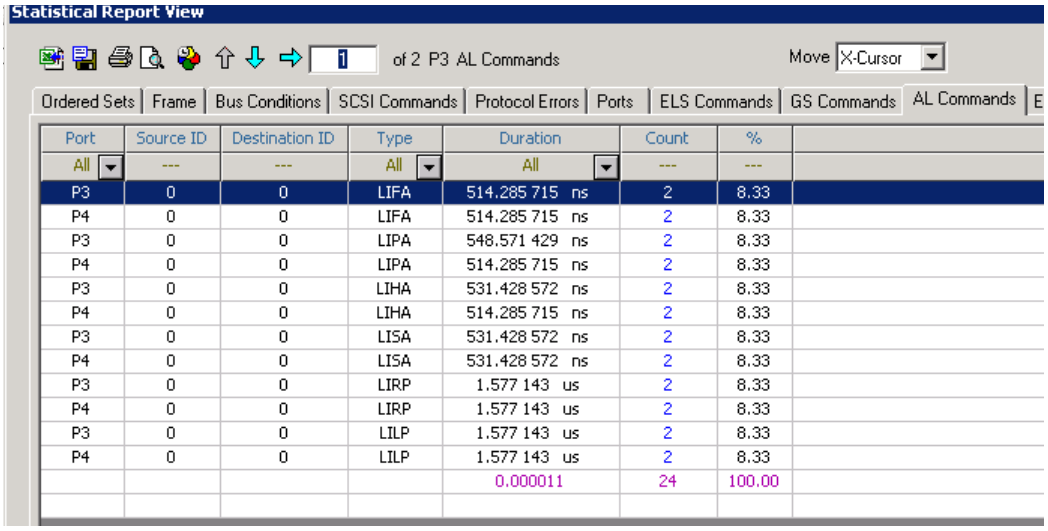
Port	Source ID	Destination ID	Type	Response Type	Duration	Count	%
All	All	All	All	All	All	All	---
P3	FABRIC	FABRIC	ELP	Reject	1.045 714 us	1	1.47
P4	FABRIC	FABRIC	ELP	Reject	857.142 858 ns	1	1.47
P3	FABRIC	FABRIC	ELP	Accept	1.302 857 us	1	1.47
P3	FABRIC	FABRIC	ESC	Accept	548.571 429 ns	1	1.47
P4	FABRIC	FABRIC	EFP	Accept	1.268 571 us	2	2.94
P3	FABRIC	FABRIC	EFP	Accept	548.571 429 ns	1	1.47
P4	FABRIC	FABRIC	DIA	Accept	480.000 001 ns	1	1.47
P3	FABRIC	FABRIC	RDI	Accept	480.000 001 ns	1	1.47
P4	FABRIC	FABRIC	HLO		1.388 571 us	4	5.88
P3	FABRIC	FABRIC	HLO		1.422 857 us	4	5.88
P3	FABRIC	FABRIC	LSU		1.234 286 us	3	4.41
P4	FABRIC	FABRIC	LSU		1.217 143 us	3	4.41
P4	FABRIC	FABRIC	LSA		1.131 429 us	3	4.41
P3	FABRIC	FABRIC	LSA		1.131 429 us	3	4.41
P3	FABRIC	FABRIC	MR Basic Zoning	Accept	634.285 715 ns	1	1.47
P4	FABRIC	FABRIC	MR Basic Zoning	Accept	634.285 715 ns	1	1.47
P3	FFFC61	FFFC62	ESS	Reject	1.817 143 us	1	1.47
P4	FFFC62	FFFC61			2.331 429 us	6	8.82
P3	FFFC61	FFFC62			16.405 714 us	30	44.12
					0.000036	68	100.00

Figure 3.42: SW Commands Report

AL Commands

To display the AL Commands Report, click the **AL Commands** tab. The following information is displayed in this report:

- **Port**: All, Custom and ports that are selected
- **Source ID:**
- **Destination ID:**
- **Type**: All, Custom and other
- **Duration**: All, Custom and other
- Count
- %



Port	Source ID	Destination ID	Type	Duration	Count	%
All	---	---	All	All	---	---
P3	0	0	LIFA	514.285 715 ns	2	8.33
P4	0	0	LIFA	514.285 715 ns	2	8.33
P3	0	0	LIPA	548.571 429 ns	2	8.33
P4	0	0	LIPA	514.285 715 ns	2	8.33
P3	0	0	LIHA	531.428 572 ns	2	8.33
P4	0	0	LIHA	514.285 715 ns	2	8.33
P3	0	0	LISA	531.428 572 ns	2	8.33
P4	0	0	LISA	531.428 572 ns	2	8.33
P3	0	0	LIRP	1.577 143 us	2	8.33
P4	0	0	LIRP	1.577 143 us	2	8.33
P3	0	0	LILP	1.577 143 us	2	8.33
P4	0	0	LILP	1.577 143 us	2	8.33
				0.000011	24	100.00

Figure 3.43: AL Commands Report

Exchange Performance Report

To display the Exchange Performance Report (see Figure 3.44 on page 222), click the **Exchange Performance** tab. The following information is displayed in this report:

- **Port**: All, Custom and ports that are selected
- Source ID
- Destination ID
- R/W Type
- Min Response
- Max Response
- Average Response
- Min Efficiency
- Max Efficiency
- Average Efficiency
- Total Command
- Total Byte: Represents count of data payloads. Removed idles and truncated payload frames do not affect the total byte value.
- Total Duration: All, Custom and other
- Min RW/Sec
- Max RW/Sec

- Average RW/Sec

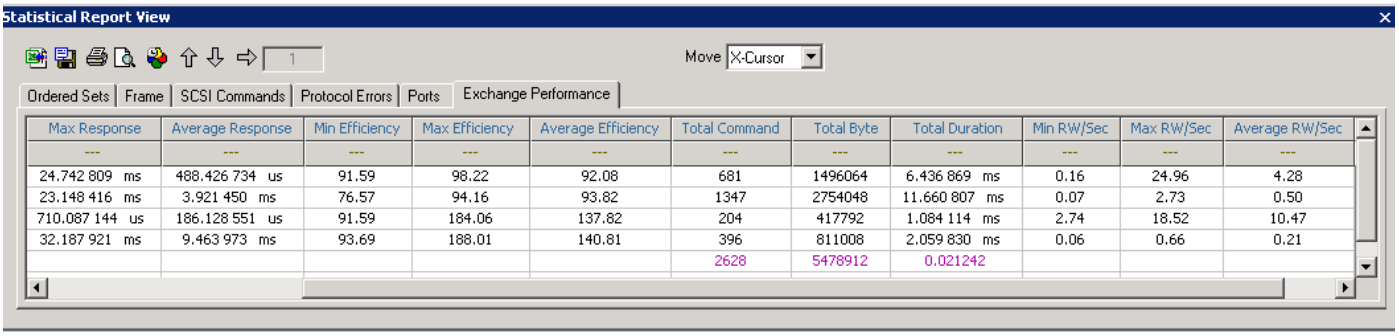
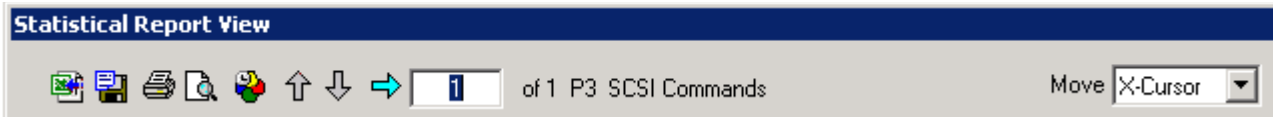


Figure 3.44: Exchange Performance Report

Statistical Report Toolbar

The Statistical Report toolbar provides the following functions accessible by buttons on the toolbar:

- Export to Excel
- Save as Text
- Print Report
- Print Preview
- Report Display Settings
- Move to **X-Cursor, Y-Cursor**, or **None**



Export as Microsoft® Excel file

The **Export to Excel** button opens the Export to Excel dialog. Choose a folder in which to save the Excel file, choose an appropriate file name, and click **Save.**

Save as Text file

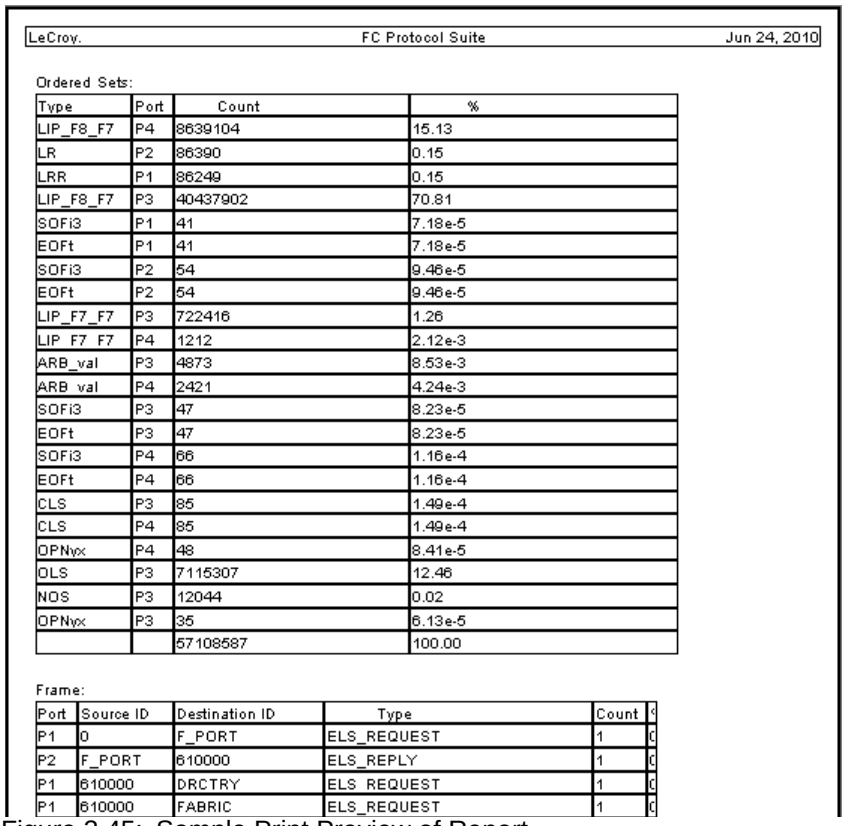
The **Save as Text** button opens the Export to Text dialog. Choose a folder in which to save the Text file, choose an appropriate file name, and click **Save.**

Print Statistical Report

The **Print** button opens the select printer dialog. Choose an available printer and click **OK.**

Print Preview

The **Print Preview** button displays a preview of the report to print**.**



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Ordered Sets:

Type	Port	Count	%
LIP_F8_F7	P4	8639104	15.13
LR	P2	86390	0.15
LRR	P1	86249	0.15
LIP_F8_F7	P3	40437902	70.81
SOFi3	P1	41	7.18e-5
EOFt	P1	41	7.18e-5
SOFi3	P2	54	9.46e-5
EOFt	P2	54	9.46e-5
LIP_F7_F7	P3	722416	1.26
LIP_F7_F7	P4	1212	2.12e-3
ARB_val	P3	4873	8.53e-3
ARB_val	P4	2421	4.24e-3
SOFi3	P3	47	8.23e-5
EOFt	P3	47	8.23e-5
SOFi3	P4	66	1.16e-4
EOFt	P4	66	1.16e-4
CLS	P3	85	1.49e-4
CLS	P4	85	1.49e-4
OPNyx	P4	48	8.41e-5
OLS	P3	7115307	12.46
NOS	P3	12044	0.02
OPNyx	P3	35	6.13e-5
		57108587	100.00

Frame:

Port	Source ID	Destination ID	Type	Count
P1	0	F_PORT	ELS_REQUEST	1
P2	F_PORT	610000	ELS_REPLY	1
P1	610000	DRCTRY	ELS_REQUEST	1
P1	610000	FABRIC	ELS_REQUEST	1

Figure 3.45: Sample Print Preview of Report

Report Display Settings

The **Setting** button opens the Setting dialog.

You can set up the report columns for display to suit a particular analysis need, eliminating the need to show/hide columns individually. Use the **Setting** dialog to configure the display for each page. See Figure 3.46 on page 224.

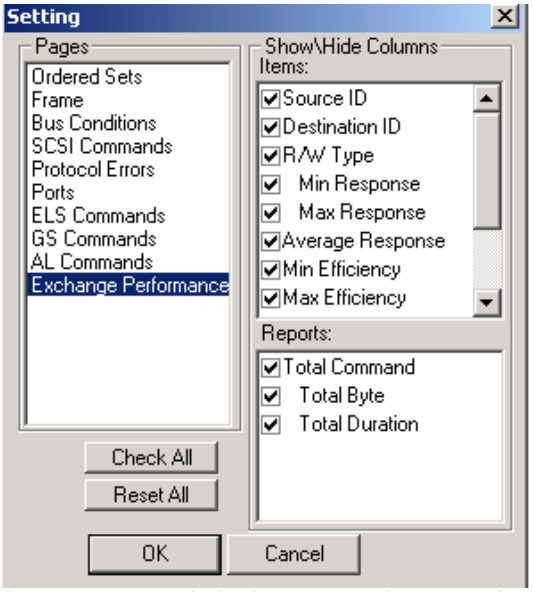


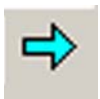
Figure 3.46: Statistical Report Column Setting

Link With Sample View

When you select a type on any page of the Statistical Report, a set of navigation buttons allows you to examine each instance of that type in the Trace Viewer.

The **Jump to Previous** button goes to the previous instance of the selected type in the Trace Viewer**.**

The **Jump to Next** button goes to the next instance of the selected type in the Sample Viewer**.**



The **Jump to Specific** button goes to the instance specified as N of M items on the Statistical Report toolbar**.**

The **Move** drop-down list moves to the X-Cursor, Y-Cursor, or None**.**

Formatting the Statistical Report View

Initially the Statistical Report View contains all of the information in columns, but you can customize the display by:

- Filtering columns by item
- Sorting items by column
- Hiding any column on the display

Filtering Column Content

To filter column content, click the down arrow in the heading for that column and choose the items to display. The default is All. By checking a specific item, you exclude everything but that item for display.

Choosing **Custom** allows you to specify more than one item for display. Check the items to display and click **OK**.

Sorting Column Content

To sort column content, click the **heading** for that column. Repeated clicking of the column heading sorts the column in ascending or descending order.

Hiding Columns

To hide a column, right-click in the column and choose **Hide**. To unhide a column, right-click any column and choose **Unhide**.

Formatting Columns

To format a column, right-click in the column and choose **Format**. The options are:

- Hexadecimal
- Binary
- ASCII
- Decimal

Tools

The Tools menu displays two options:

1. Self Test
2. Verification Script.

Self Test

You can use the built-in self-test utility. The self test is performed to check the clock, memory, serdes, crosspoint, LED/buzzer settings are good. Go to **Tools** on the main menu bar and choose **Self Test** to open the Self Test dialog. See Figure 3.47 on page 226.

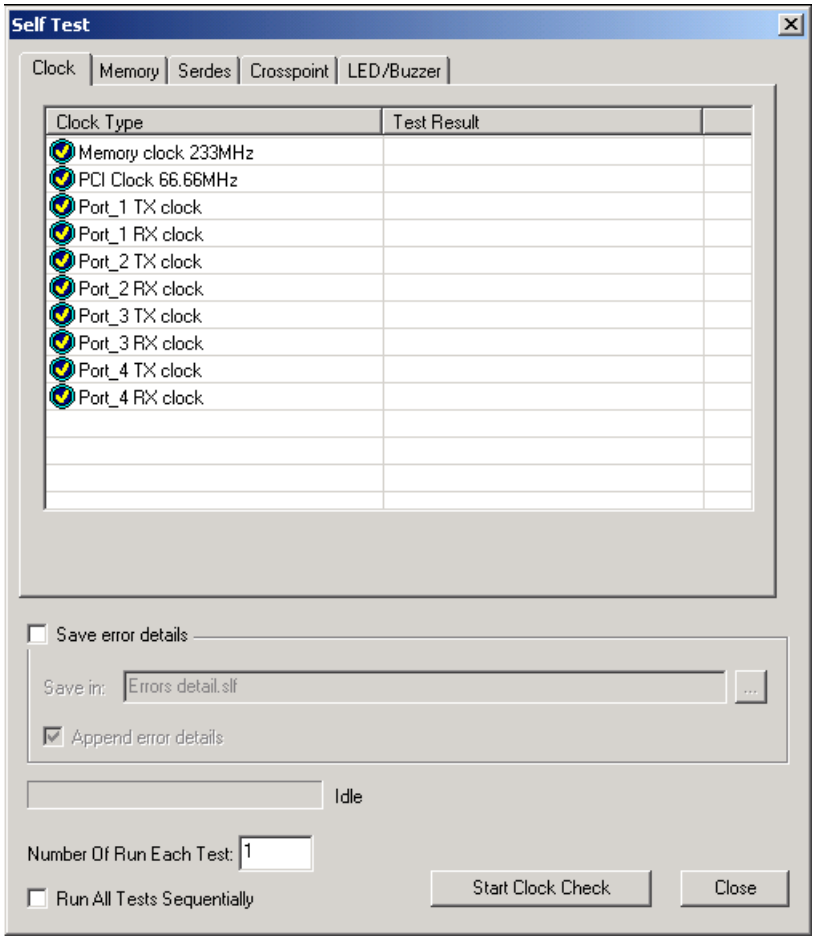


Figure 3.47: Tools - Self Test Dialog

Self Test Tabs

You can Self Test with the options available in the Self Test Dialog.

Choose the function to test and click the **Start ... Check** button. After a short time, the Test Result appears to the right of the selected line.

Test Result Column

If a test is OK and you specified one run, the Test Result column on the right displays **OK: 1 times** (see the screen capture above).

If a test has an error and you specified one run, the Test Result column on the right displays **Error: 1 times** (see the screen capture above).

Saving

You can save any check result by checking the **Save error details** check box and specifying a destination file name.

Number of Runs Each Test

You can specify to run a test more than once.

Run All Tests Sequentially

Check this box to run tests sequentially.

Running Verification Script Engine (VSE)

You can use the built-in verification script utility. Verification Scripts utilize the VSE ('engine') to parse traces for specific events and reports. For additional details on VSE, refer to the *Verification Script Engine for SierraFC Protocol Suite Reference Manual.*

Go to **Tools** on the main menu bar and choose **Verification Script** to open the Verification Script dialog.

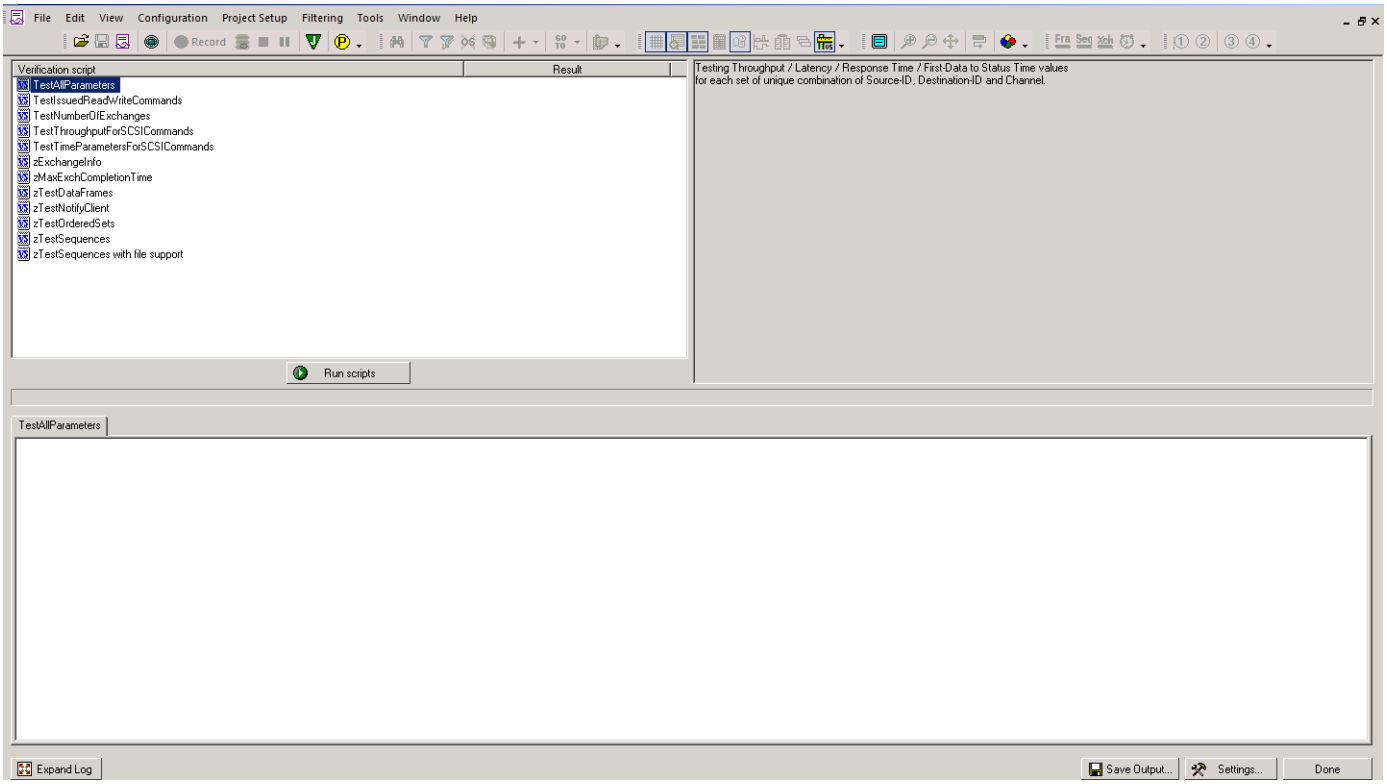


Figure 3.48: Verification Script Dialog

Run Script

You can run scripts with the tests available in the Verification Script Dialog.

Choose the function to test and click the **Run Scripts** button. After a short time, the result appears in the log pane.

Click **Expand Log** to expand or collapse the log pane.

You can save the output. Click **Save Output** to open the Saving Output dialog.

Figure 3.49: Saving Output Dialog

Settings

The settings for the Editor Application, Display and Save options can be made in the Settings dialog. Click **Settings** to open the Settings DIalog (see Figure 3.50 on page 229). Select the desired options and click **OK**.

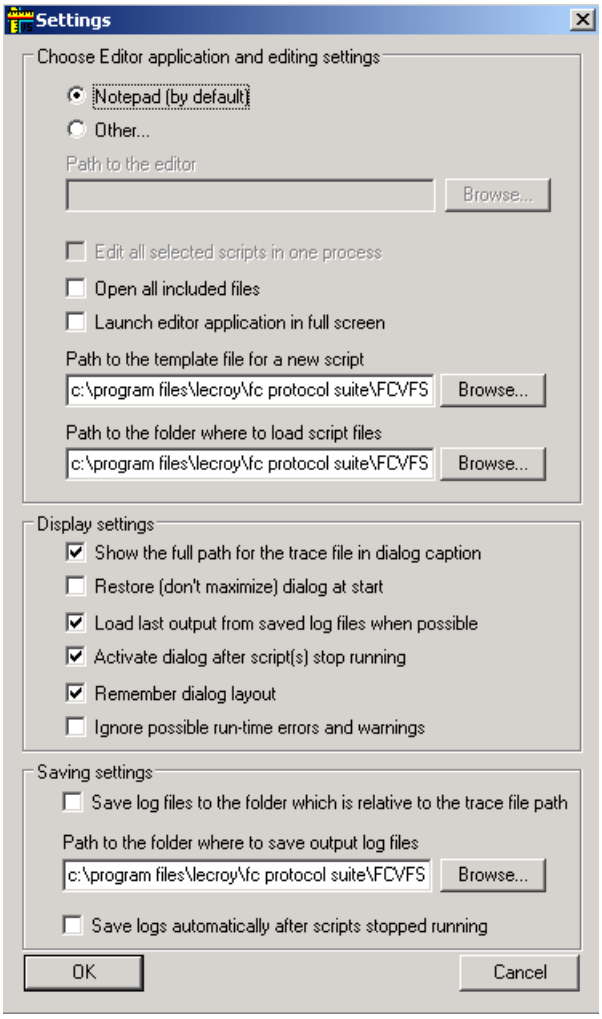

Settings
Choose Editor application and editing settings
Notepad (by default)
Other...
Path to the editor
Browse...
Edit all selected scripts in one process
Open all included files
Launch editor application in full screen
Path to the template file for a new script
c:\program files\lecroy\fc protocol suite\FCVFS
Browse...
Path to the folder where to load script files
c:\program files\lecroy\fc protocol suite\FCVFS
Browse...
Display settings
Show the full path for the trace file in dialog caption
Restore (don't maximize) dialog at start
Load last output from saved log files when possible
Activate dialog after script(s) stop running
Remember dialog layout
Ignore possible run-time errors and warnings
Saving settings
Save log files to the folder which is relative to the trace file path
Path to the folder where to save output log files
c:\program files\lecroy\fc protocol suite\FCVFS
Browse...
Save logs automatically after scripts stopped running
OK
Cancel

Figure 3.50: Settings Dialog

Choose the editor application: Notepad or other.

Edit all selected scripts in one process: If the editor supports multiple documents, you can edit all scripts in the editor.

Open all included files: You can edit included files, as well as the main script.

Launch editor application in full screen: You can use whole screen.

Path to the template file for a new script: You can use a template for the script.

Path to the folder where to load script files: You can load the script files.

Display Settings can show full trace-file path, restore dialog at start, load last output from save log files, activate dialog after scripts have run, remember dialog layout, and ignore errors and warnings.

Saving Settings can save log files to relative file folder, indicate output-log-file path, and save logs automatically.

Right-click Script Menu Options

Right-clicking in the script list displays some additional operations over selected scripts:

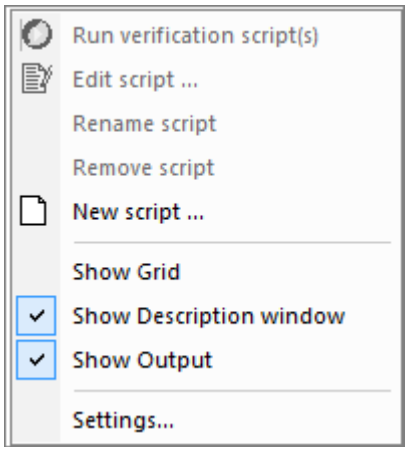


Figure 3.51: Run Verification Scripts - Menu

Run verification script(s): Start running selected script(s).

Edit script: Edit selected scripts in the editor application specified in Editor settings.

Rename script: Rename the selected script by entering a new name.

Remove script: Removes the selected script. The application prompts the user to confirm removal.

New script: Create a new script file using the template specified in Editor settings.

Show Grid: Show/hide a grid in the verification script list.

Show Description window: Show/hide the script description window (Shortcut key F2).

Show Output: Show/hide the script output windows (Shortcut key F3).

Settings: Open a special Setting dialog to specify different settings for VSE (see Figure 3.50 on page 229).

Quick Filtering

The Filtering Setup allows you to modify data in the sample viewer display to include and exclude packets with a set of user-defined patterns and show the results in all views.

To set up filtering, you must have a trace open. Click the Filtering Setup button on the top toolbar. The Quick Filtering dialog displays. Select a frame from the dropdown menu, select **Show** or **Hide** to Show/Hide items and select **AND/OR** as shown below.

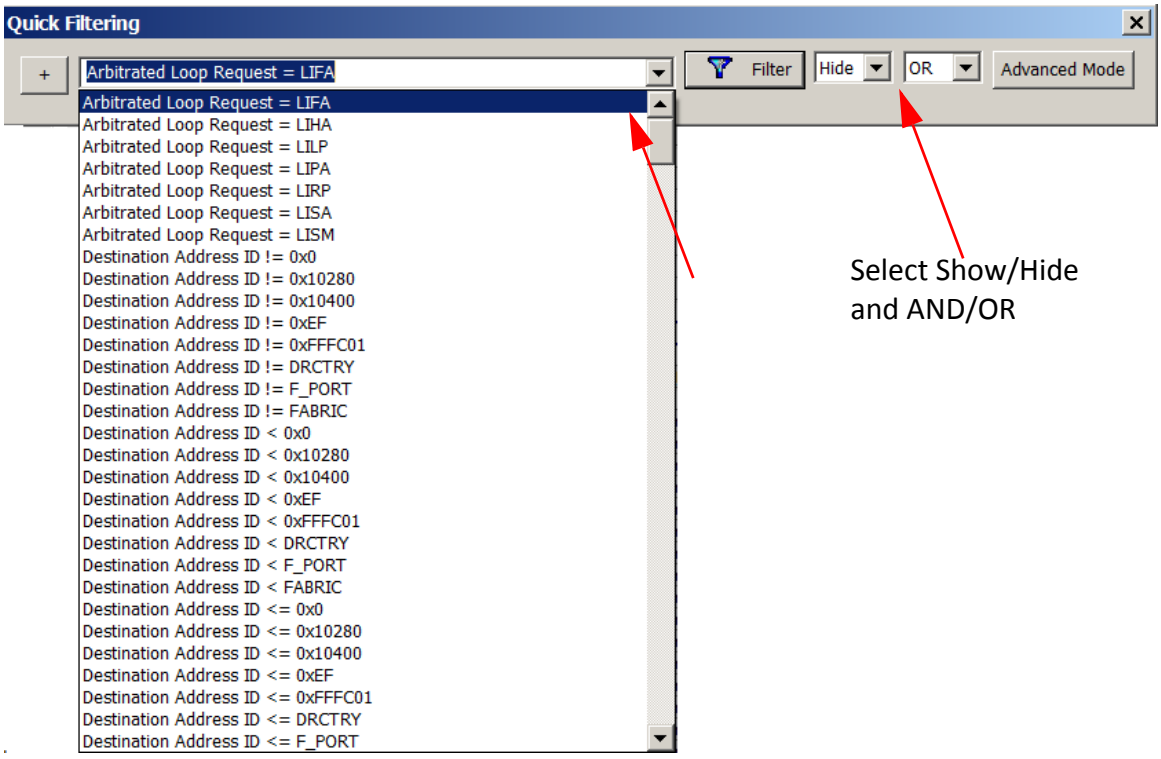

Quick Filtering
+
Arbitrated Loop Request = LIFA
Filter
Hide
OR
Advanced Mode
Arbitrated Loop Request = LIFA
Arbitrated Loop Request = LIHA
Arbitrated Loop Request = LILP
Arbitrated Loop Request = LIPA
Arbitrated Loop Request = LIRP
Arbitrated Loop Request = LISA
Arbitrated Loop Request = LISM
Destination Address ID != 0x0
Destination Address ID != 0x10280
Destination Address ID != 0x10400
Destination Address ID != 0xEF
Destination Address ID != 0xFFFC01
Destination Address ID != DRCTRY
Destination Address ID != F_PORT
Destination Address ID != FABRIC
Destination Address ID < 0x0
Destination Address ID < 0x10280
Destination Address ID < 0x10400
Destination Address ID < 0xEF
Destination Address ID < 0xFFFC01
Destination Address ID < DRCTRY
Destination Address ID < F_PORT
Destination Address ID < FABRIC
Destination Address ID <= 0x0
Destination Address ID <= 0x10280
Destination Address ID <= 0x10400
Destination Address ID <= 0xEF
Destination Address ID <= 0xFFFC01
Destination Address ID <= DRCTRY
Destination Address ID <= F_PORT
Select Show/Hide and AND/OR

Figure 3.52: Quick Filtering Dialog

Click on the **Advanced Mode** button to display the Filter dialog (see Figure 3.21 on page 198). Select the desired options to show/hide.

You can also click **Filtering > Filtering** to display the Quick Filtering dialog as shown below.

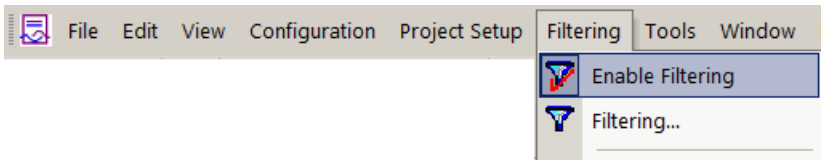


Figure 3.53: Filtering Menu Options

Clicking on **Enable Filtering** toggles between enabling and disabling the filtering option.

Filter Setup in Advanced Mode

Click the **Advanced Mode** button to set up filtering in the Advanced mode. Click on the Quick Filter button to display the Quick Filtering dialog as shown in Figure 3.52 on page 231.

Note: The Filtering dialog display defaults to the last set option (Quick Filtering or Advanced Filter).

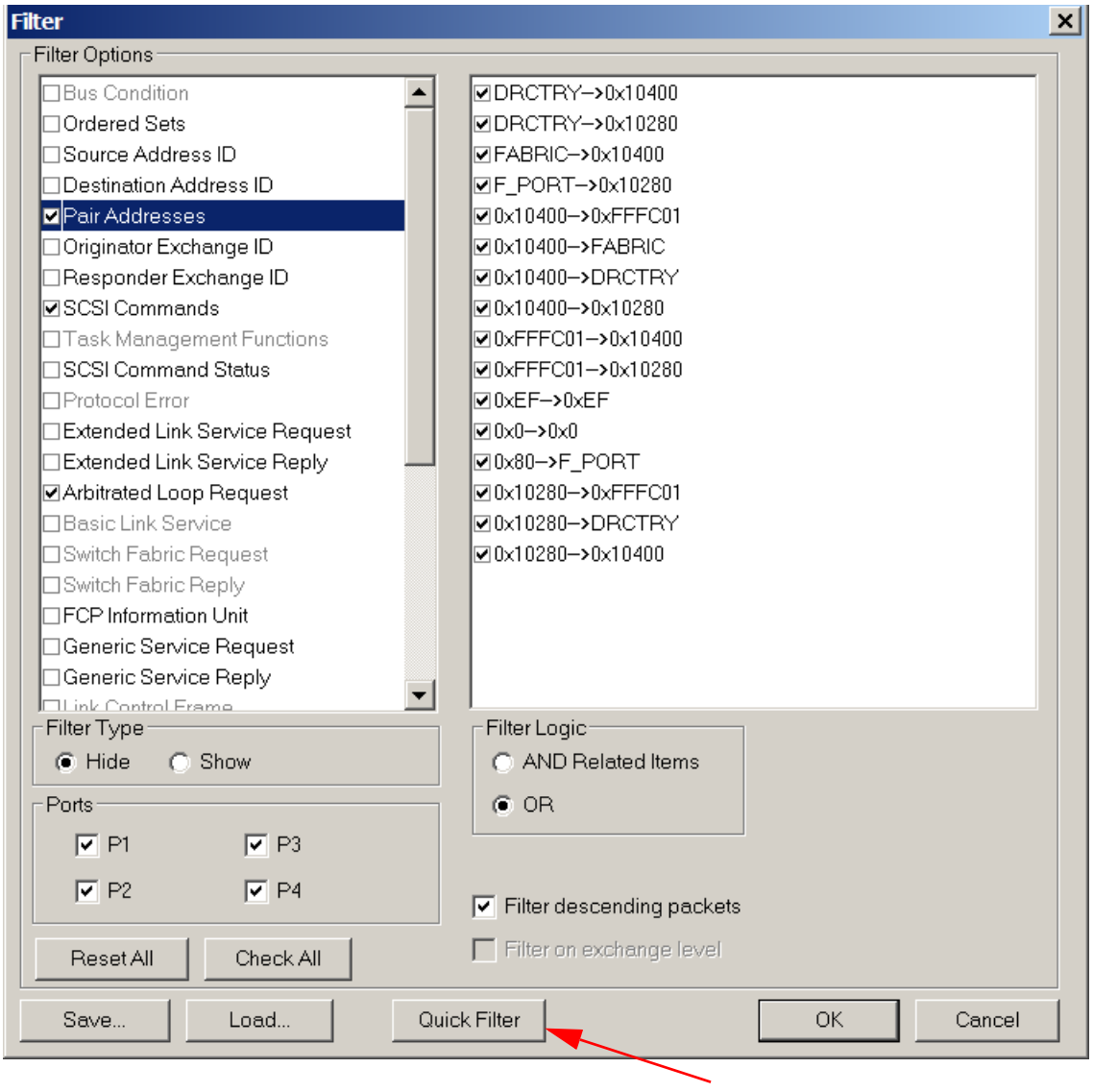


Figure 3.54: Filter Setup in Advanced Mode Dialog

You can select or deselect each of the items shown in the Filter Options window for filtering, by checking or unchecking a corresponding check box. Items not in the current sample are in shade.

NOTE 1: If you select a group, that also selects all child items.

NOTE 2: Only packets captured at run time are available for selection for filtering.

Filter Type

You can choose to show or hide the Filter Type items by checking the **Show** or **Hide** option button.

Filtering Direction

You can select items for filtering in a single direction or both directions by checking the corresponding Port. By default, all ports are enabled. Uncheck the port check boxes for ports not to include in the filter.

Filter Idle

Depending on the Filter Type (Hide/Show), Idle packets in the Sample Viewer are shown or hidden.

Save Filter Setup

After you have set up a Filter configuration, you can save it as a Filter file by clicking **Save**. You can then use it on a different capture by clicking **Load** in the Filter dialog.

Filter Logic

After you have set up Filter options, you can set filter logic to **And Related Items** to apply "AND" logic on related selected options or **OR** to apply "OR" logic on all selected options.

Filter descending packets

If you check the **Filter descending packets** checkbox, the application will only filter onward from the highlighted trace selection bar.

If you uncheck this option, the software only filters the filtered packet. For example, if this option is checked and any SCSI command is selected, all transport and link packets of this command are filtered. If you unchecked this option, only selected SCSI commands are filtered.

Filter on exchange level

Checking the **Filter on exchange level** checkbox will cause the application to examine the Exchange level parameter for deciding on filtering, rather than lower level parameters. An example is RX_ID, which might be different for different Sequences in an Exchange (the first Sequence's RX_ID is always 0xFFFF), but is considered unique for the whole Exchange.

Selectable Filter Options

The Filter Options are (see Figure 3.55 on page 235):

- Bus Condition
- Ordered Sets
- Source Address ID
- Destination Address ID
- Pair Addresses
- Originator Exchange ID
- Responder Exchange ID
- SCSI Commands
- AE RDMA SCSI Commands

- ❑ Task Management Functions
- ❑ SCSI Command Status (see “Filter Check Condition” below)
- ❑ Protocol Error
- ❑ Extended Link Service Request
- ❑ Extended Link Service Reply
- ❑ Arbitrated Loop Request
- ❑ Basic Link Service
- ❑ Switch Fabric Request
- ❑ Switch Fabric Reply
- ❑ FCP Information Unit
- ❑ Generic Service Request
- ❑ Generic Service Reply
- ❑ Link Control Frame
- ❑ Miscellaneous (see “Filter Miscellaneous” below)
- ❑ Incomplete Exchange
- ❑ FICON Data Information Block
- ❑ FICON Command
- ❑ FICON Control Function
- ❑ FICON Link Control Function
- ❑ Training Sequence
- ❑ AE1553 Information Unit
- ❑ FC-VI Information Unit
- ❑ AE ASM Information Unit
- ❑ FC-AV Information Unit

Bus Condition

When selected, depending on the Filter Type, the Hide/Show selection shows or hides captured Bus Conditions in the Sample Viewer.

Protocol Error

When selected, depending on the Filter Type, the Hide/Show selection shows or hides captured packets with the specified Protocol Errors in the Sample Viewer.

Filter Check Condition

Checking the **SCSI Command Status** check box enables Check Condition for filtering.

Filter Miscellaneous

When you choose **Miscellaneous**, an additional dialog displays (see Figure 3.55 on page 235), allowing you to specify the filtering of State Range and/or External Signal In.

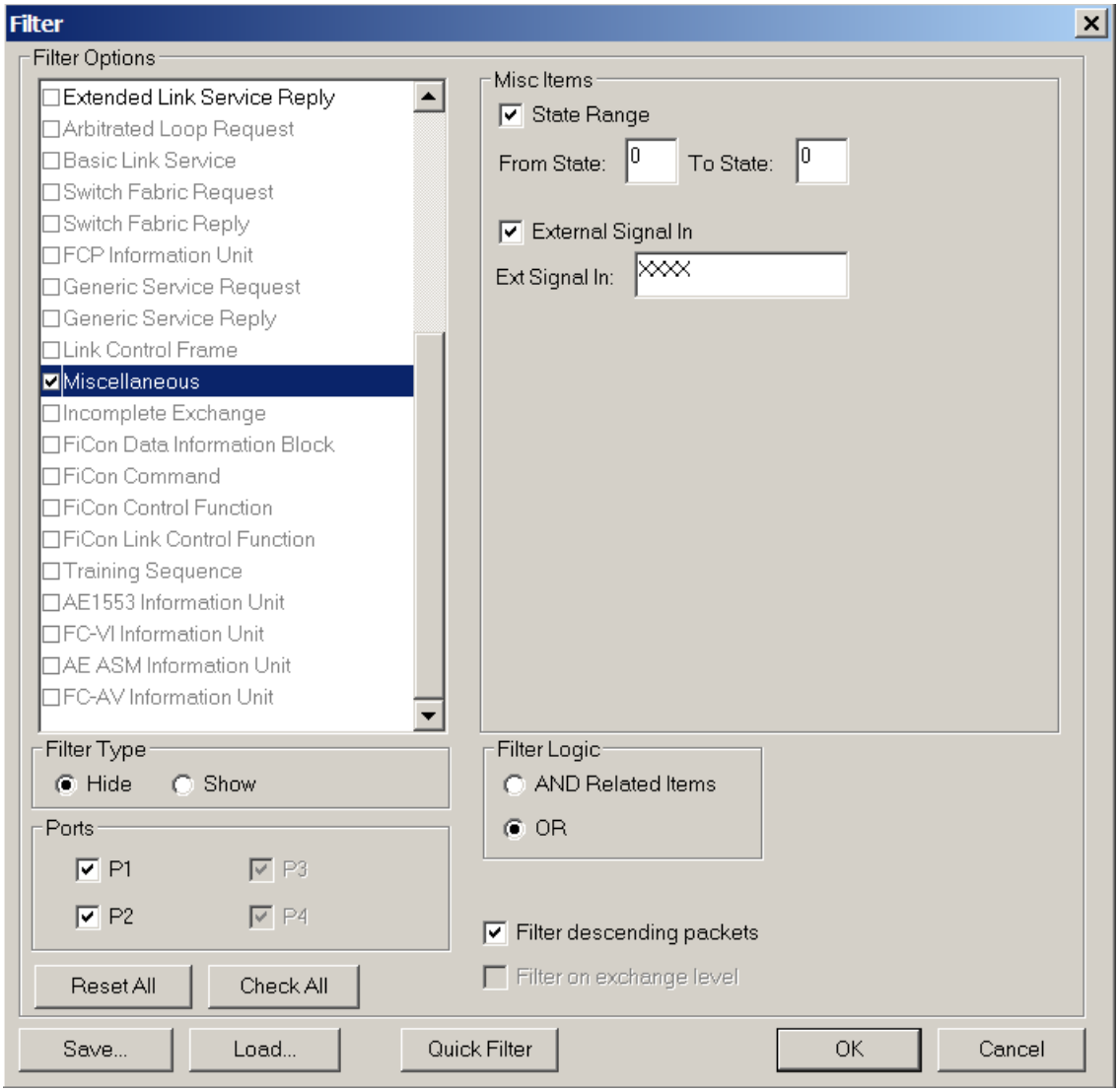


Figure 3.55: Selecting Filter State and/or External Signals

Enable Filter

Select **Filtering > Enable Filtering** or click the **Filter Enable** button on the display menu bar to toggle between Filtered and Unfiltered display.

Using Cursors and Bookmarks

Cursors

The data viewer display incorporates three cursors labeled **X, Y,** and **T.** All cursors are initially overlaid and positioned at location 0, which is the trigger position of the display. The Trigger, or **T**, cursor is the measurement reference and is always at location 0 in the display.

Positioning the X Cursor

To position the X-Cursor within the viewer data display, click the left mouse button in the gray bar on the left side of the sample viewer next to the line in which to place the cursor.

Positioning the Y Cursor

To position the Y-cursor within the viewer data display, click the right mouse button in the gray bar on the left side of the sample viewer next to the line in which to place the cursor.

Note: You can also left-click to set the X-cursor and right-click to set the Y cursor in the Frame List View by clicking in the narrow strip on the very left side of a cell.

Time

Time differences between the cursors are displayed in the Cursor Position toolbar. To display the cursor position toolbar, select **Toolbar** from the View menu and choose Cursor Position.

Figure 3.56: Cursor Position Toolbar

Locate Cursors

To quickly locate any cursor within the data viewer display, click the **Go To** button and choose the cursor to locate. You can also locate a cursor by selecting **Go To** from the Edit menu and choosing the cursor to locate.

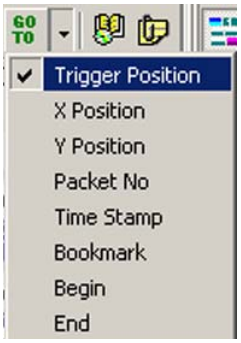


Figure 3.57: Locate Cursor

Go to Time Stamp

To locate a timestamp, click the **Go To** button and choose **Timestamp**.

Enter a time stamp value in the Go To Timestamp dialog and click **OK**.

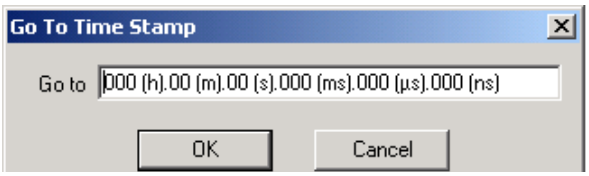


Figure 3.58: Go to Time Stamp

Bookmarks

Bookmarks are a convenient way to mark a point in the data viewer display by name, so that you can rapidly return to that point. To create a bookmark, right-click the mouse in the data viewer area on a packet in which to place the bookmark.

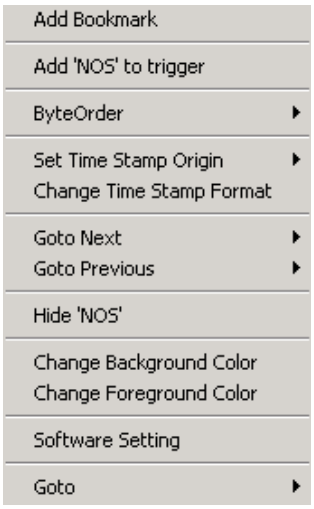


Figure 3.59: Bookmark

Click **Bookmark** from the fly out menu to open the Bookmark Comment Dialog.

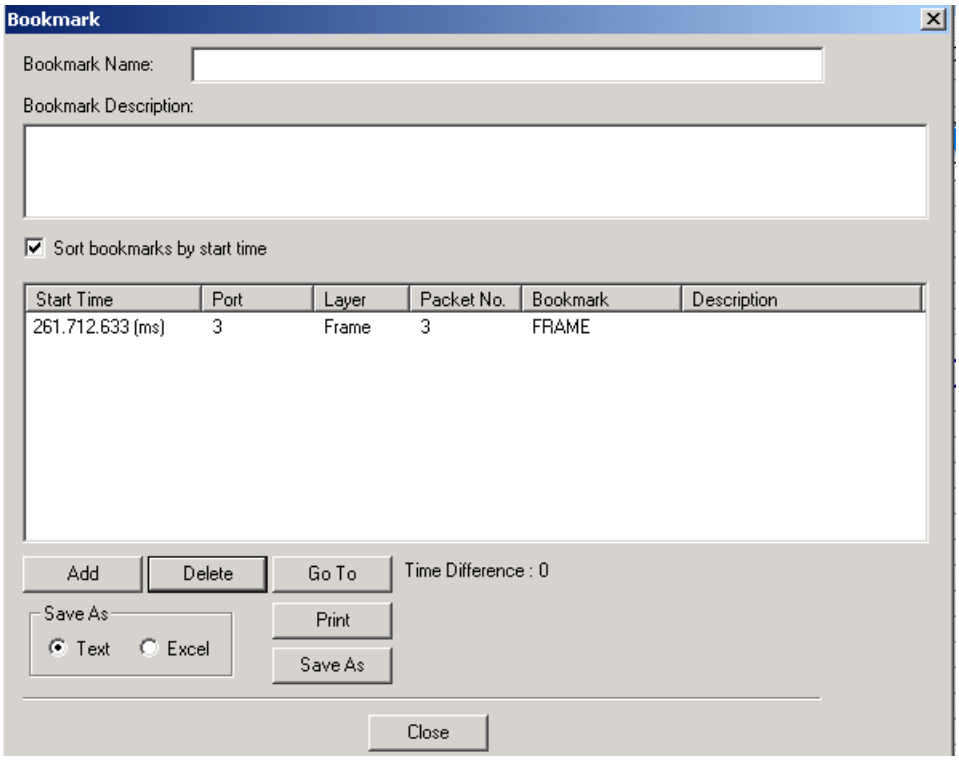


Figure 3.60: Bookmark Dialog

Enter a description for the bookmark and click the **Add** button. Repeat for additional **bookmarks.**

Finding a Bookmark

To find a bookmark in the data viewer display, right-click the mouse in the sample viewer and select **Bookmark**.

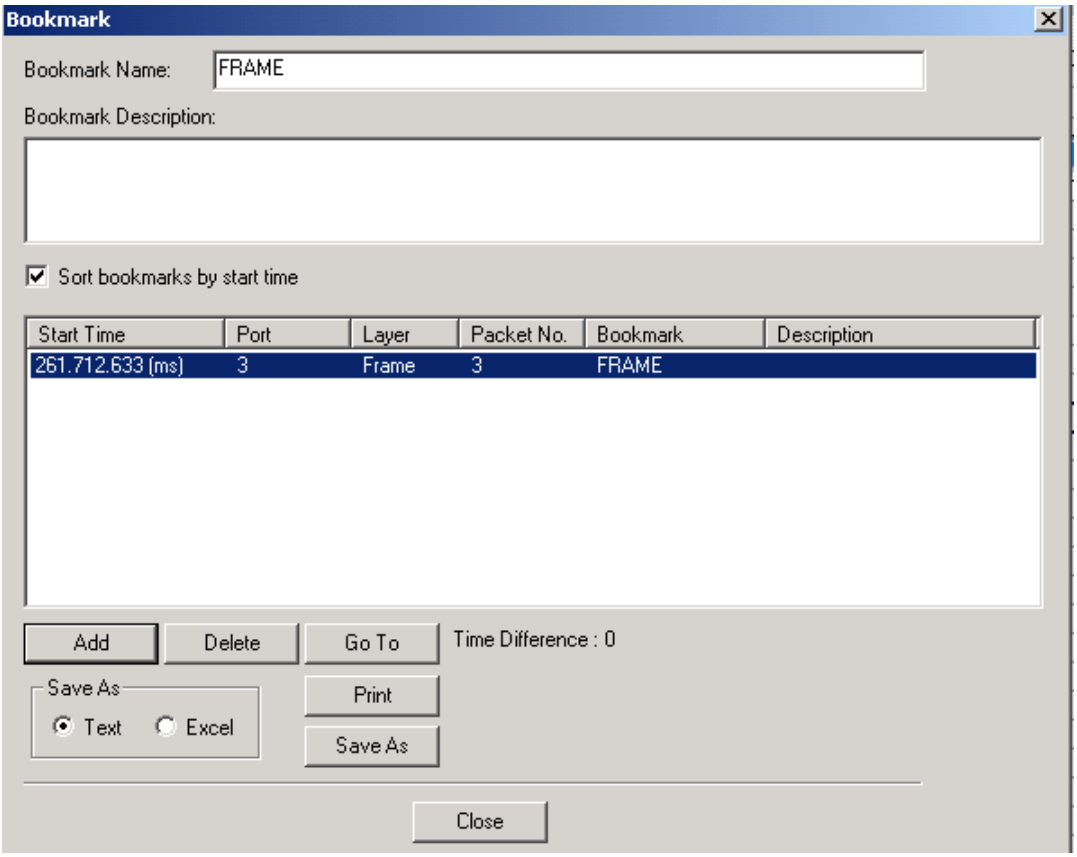


Figure 3.61: Go To Bookmark Dialog Box

Highlight the bookmark to which to go, then click the **Go To** button, or double-click the selection**.**

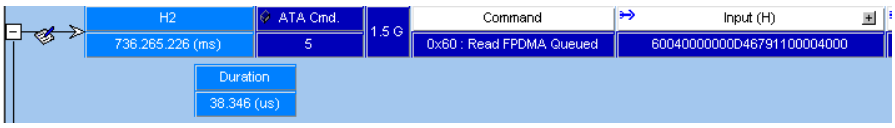


Figure 3.62: Bookmark Found Example in Data Viewer Display

Bookmark Description

To get a quick description of a displayed bookmark, position the tool tip over a bookmark. The name and description of the bookmark display.

Set Time Stamp Origin

Right-click in the sample viewer to open the fly out menu:

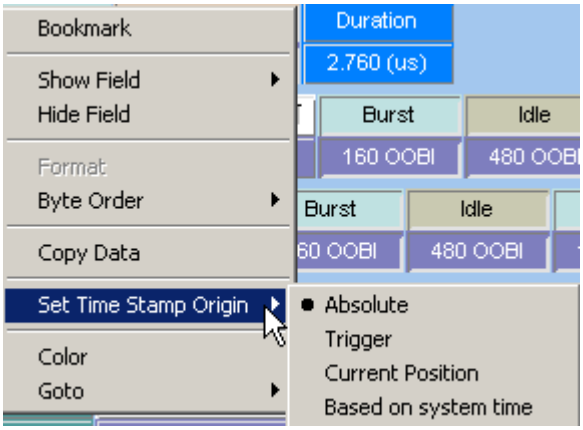


Figure 3.63: Bookmark Found Example in Data Viewer Display

Highlight **Set Time Stamp Origin** and choose either Absolute, Trigger, Current Position, or Based on system time.

Quick Search

The Quick Search menu and button options permit you to examine any data capture file to quickly locate the packet or data pattern.

Note: Only items captured in the sample file are enabled for search.

To perform an initial search, select **Edit > Search** or click the **Search** button. The Quick Search dialog displays (see Figure 3.64 on page 240). Select a packet from the dropdown menu, select **Show** or **Hide** to Show/Hide items and select **AND/OR** as shown below.

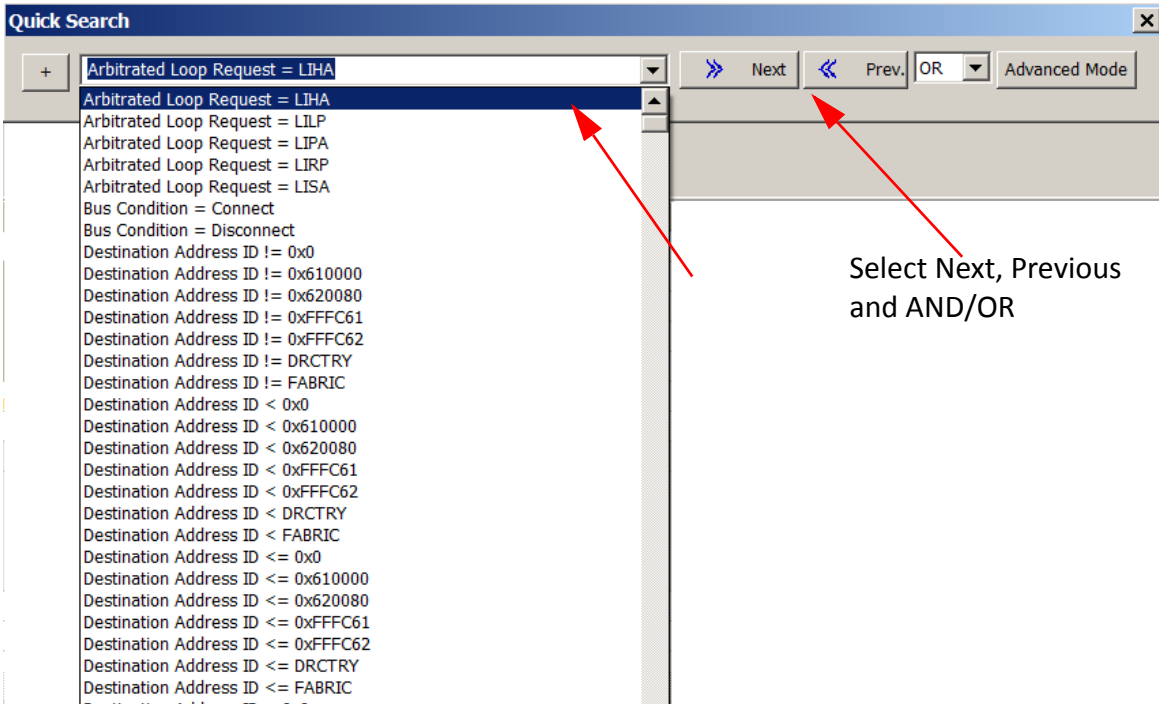

Quick Search
+
Arbitrated Loop Request = LIHA
Next
Prev.
OR
Advanced Mode
Arbitrated Loop Request = LIHA
Arbitrated Loop Request = LILP
Arbitrated Loop Request = LIPA
Arbitrated Loop Request = LIRP
Arbitrated Loop Request = LISA
Bus Condition = Connect
Bus Condition = Disconnect
Destination Address ID != 0x0
Destination Address ID != 0x610000
Destination Address ID != 0x620080
Destination Address ID != 0xFFFC61
Destination Address ID != 0xFFFC62
Destination Address ID != DRCTRY
Destination Address ID != FABRIC
Destination Address ID < 0x0
Destination Address ID < 0x610000
Destination Address ID < 0x620080
Destination Address ID < 0xFFFC61
Destination Address ID < 0xFFFC62
Destination Address ID < DRCTRY
Destination Address ID < FABRIC
Destination Address ID <= 0x0
Destination Address ID <= 0x610000
Destination Address ID <= 0x620080
Destination Address ID <= 0xFFFC61
Destination Address ID <= 0xFFFC62
Destination Address ID <= DRCTRY
Destination Address ID <= FABRIC
Select Next, Previous and AND/OR

Figure 3.64: Quick Search Dialog

Click on the **Advanced Mode** button to display the Search dialog (see Figure 3.65 on page 241). Select the desired options to show/hide.

Search Setup in Advanced Mode

Click the **Advanced Mode** button to set up search in the Advanced mode. Click on the Quick Search button to display the Quick Search dialog as shown in Figure 3.64 on page 240.

Note: The Search dialog display defaults to the last set option (Quick Search or Advanced Search).

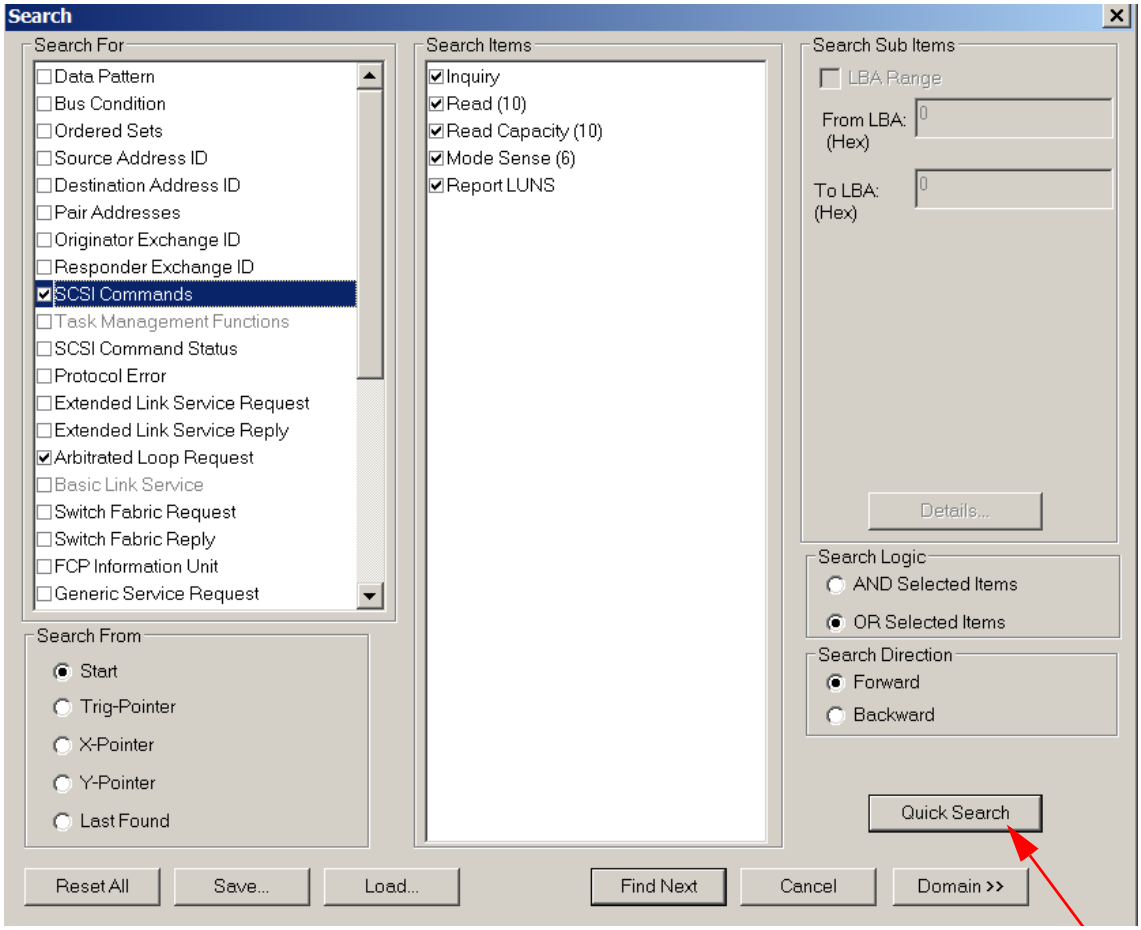


Figure 3.65: Search Data Pattern Setup in Advanced Mode Dialog

You can continue to search the output file using **Next Search (F3)** or **Previous Search (F4)** for the same pattern, until you redefine the data capture search parameters.

Save Search Setup

After you have set up a Search configuration, you can save it as a Search configuration file by clicking **Save**. You can then use it on a different capture by clicking **Load** in the Search dialog.

Search From

Choose a starting point to begin or continue a search: Start of the sample file, Trigger Pointer, X Pointer, Y Pointer, or Last Found.

Search Sub Items

Search on exchange level

Checking the **Search on exchange level** checkbox will cause the application to examine the Exchange level parameters (depending on the packet selected) for deciding on searching, rather than lower level parameters. An example is RX_ID, which might be different for different Sequences in an Exchange (the first Sequence's RX_ID is always 0xFFFF), but is considered unique for the whole Exchange.

Search Logic

The default setting is **Or Selected Items**. With this setting, clicking **Find Next** locates all selected items in turn. If you choose **And Selected Items,** you can set a logical AND combination of items to find. Both options allow setting Advanced search features.

Search Direction

Choose either **Forward** or **Backward** direction in which to perform the search.

Search For

Choose a category to search in the **Search For** window. Each of the search categories offers additional choices in the **Search Items window** to refine the search. Check items for the selected category.

Protocol Error

You can refine the search to locate packets with an error or without an error.

Data Pattern

Search for Data Pattern allows you to search for a specific Data Type, Pattern, and Length.

- Data Pattern Only
- Data Payload Length Only
- Data Pattern and Data Payload Length

Advanced options

Some of the Search For categories offer advanced options for search. To set these options, highlight the search item in a category and click the **Advanced** button to open a dialog and select options (see Figure 3.66 on page 243).

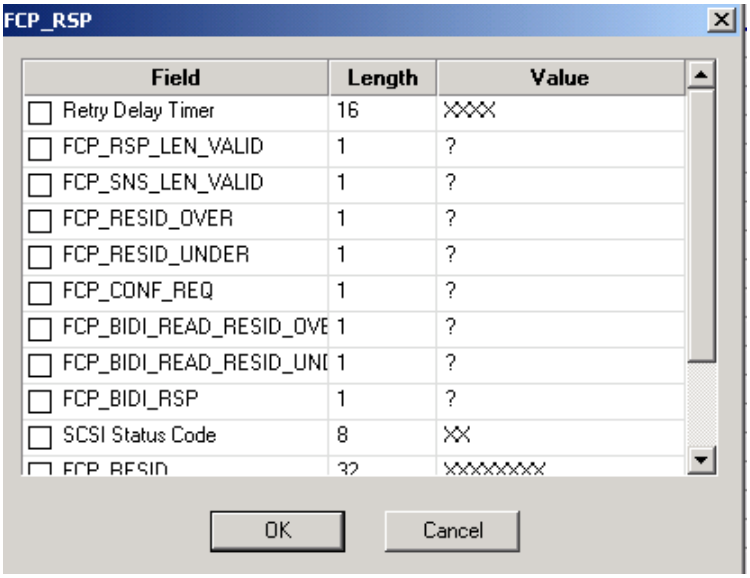


Figure 3.66: Advanced Search Options

Search Sub Items

When searching SCSI Command Status, you can refine the search by selecting from a list of Sub Items.

When you check the **SCSI Command Status,** the **Check Condition** item appears in the Search Items Window, if a check condition has occurred. Clicking this enables **Search Sub Items,** allowing you to refine the search by specifying **Sense Key, ASC,** and **ASCQ.**

When searching Responder Exchange ID, you can refine the search at the exchange level.

When you check **Responder Exchange ID,** the **Search on exchange level** check box displays in the **Search Sub Items** Window. Clicking this allows you to refine the search at the exchange level**.**

Search Domain

Click the **Domain** button and choose a search domain from all ports or a specific port.

Viewer Configuration

The Analyzer ships with a default display configuration of field and viewer settings. You can define your own field and viewer settings for a particular testing scenario.

Trace Viewer Configuration

The Trace Viewer Configuration dialog allows you to change the following fields and views:

- Frame Fields
- Sequence Fields
- SCSI Command Fields
- ELS Command Fields: ELS Command, Status, Loop Init ID
- SW Command Fields: SW Command, Status
- GS Command Fields: Command/Response code, GS_Type, GS_Subtype, Status
- FICON Fields
- Additional Fields
- Text View
- Spreadsheet View

The Trace Viewer Configuration dialog allows you to change the following display settings:

- Field settings
  - Data format
  - Visible checkbox
  - Byte Order alignment
- Field Header Setting
  - Name
  - Abbreviation
  - Foreground
- Viewer Settings
  - Wrap packets
  - Enable tool tip
- Data Payload
  - Columns in Row
  - Bytes in Column
- Time Stamp Origin: Absolute, Trigger, User Defined, Based on System Time
- Time Stamp Format and Time Format
- Header Fields Appearance
- Save Display Configurations in a file
- Load Display Configuration settings from a file
- Factory Setting (Restores Default Settings)
- Font

To customize the display, click the **Configuration** button on the Viewer toolbar, or select **Configuration > Viewer Configuration**, to open the Trace Viewer Configuration dialog.

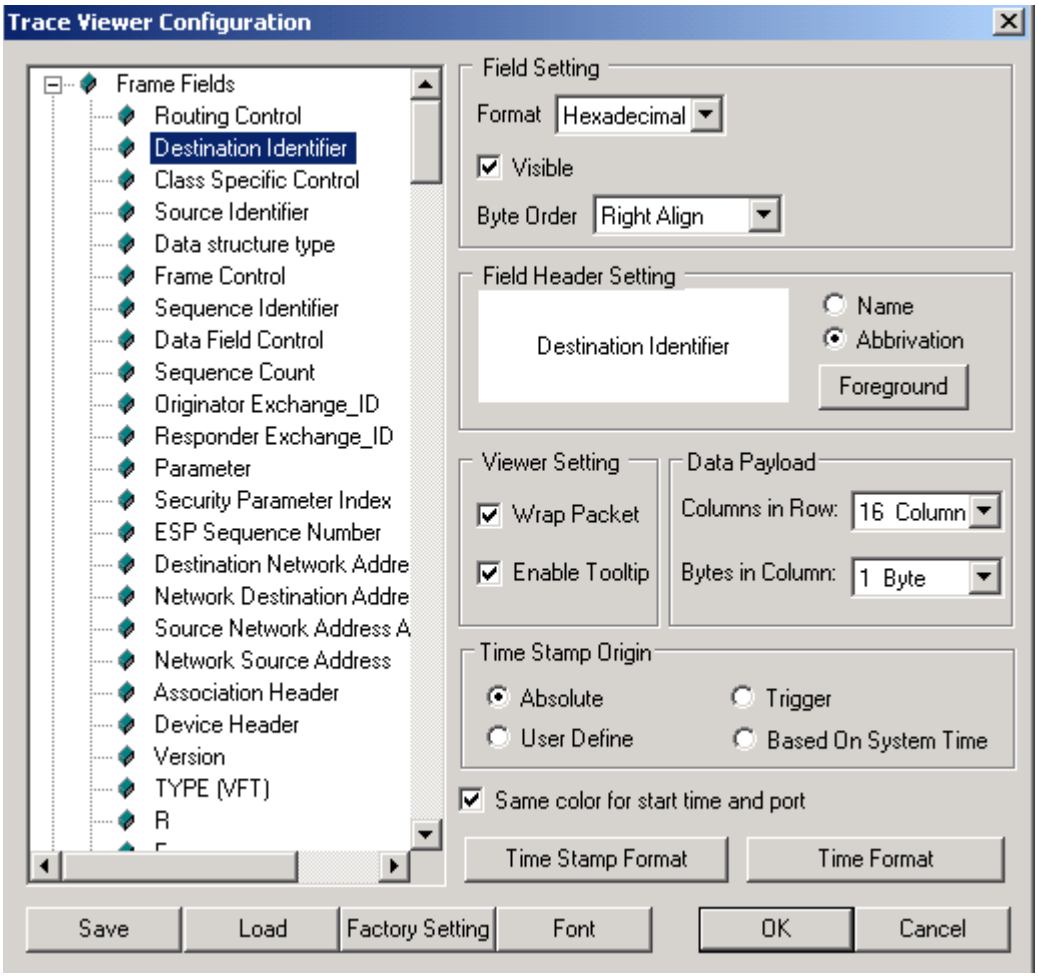


Figure 3.67: Trace Viewer Configuration

Field Settings

To view a packet field, select a field from the packet field tree and check the **Visible** box. Uncheck it to hide the field.

To change the data format of a packet field, select the field and choose a data format from the Format drop-down list.

Color

To change the color of the text in a packet field header, select a field from the packet field tree and click the **Foreground** button.

Figure 3.68: Color

Choose an appropriate color and click **OK.**

Font

To change display fonts, click the **Font** button to open the Font dialog box.

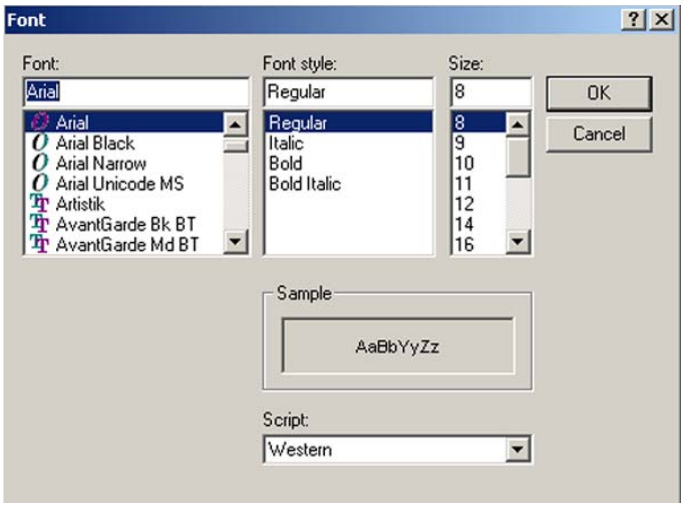


Figure 3.69: Font

Choose the font, font style, and size, and click **OK.**

Viewer Settings

Check the **Wrap Packet** box to enable the wrapping of packets in the display.

Check the **Enable Tooltip** box to enable tool tips for packet fields.

Data Payload

To change the length of byte fields displayed, select from the drop-down list to display in the **Columns in Row** and **Bytes in Column** box.

Time Stamp Origin

Check **Absolute Trig** to display trigger in real time. If left unchecked, the trigger position is t=0 with samples before trigger shown as a (-) number and after trigger as a (+) number, or check Trigger, User Defined, Based on System Time.

Same color for start time and port

Check the appropriate **Time Stamp Format** and **Time Format**.

Save/Load Settings

You can save the customized configuration settings in a ***.cfg** file by clicking the **Save** button and completing the Save As procedure. To load a previously saved configuration file, click **Load** and choose an appropriate file.

Port Configuration

Port Configuration allows you to configure the ports for the Analyzer and Jammer and the sequence in which they are attached.
To view and configure the ports, select **Configuration > Port Configuration**.

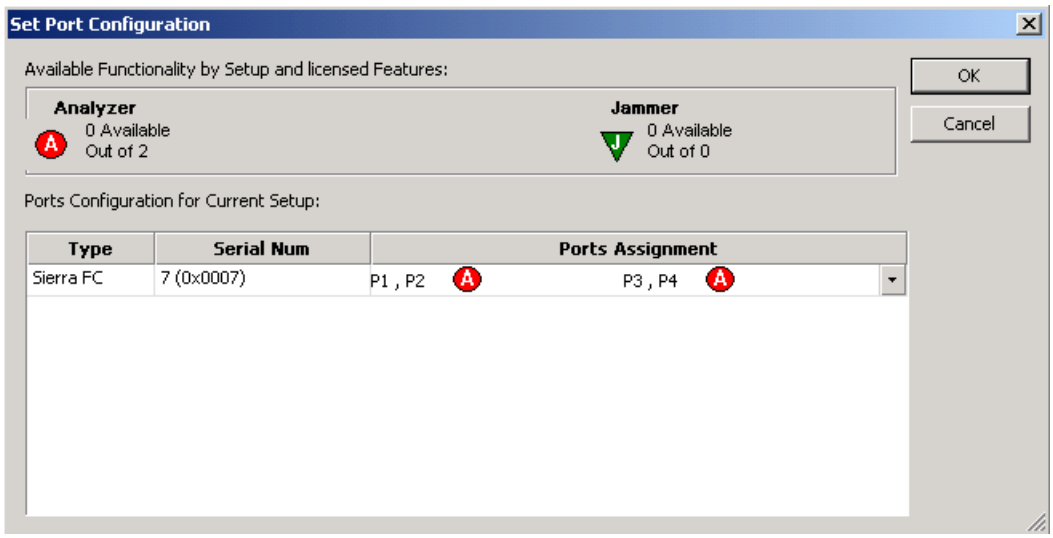


Figure 3.70: Set Port Configuration Dialog

Select a configuration from the drop down list in the Ports Assignment column and click **OK**. See Figure 3.71 on page 248.

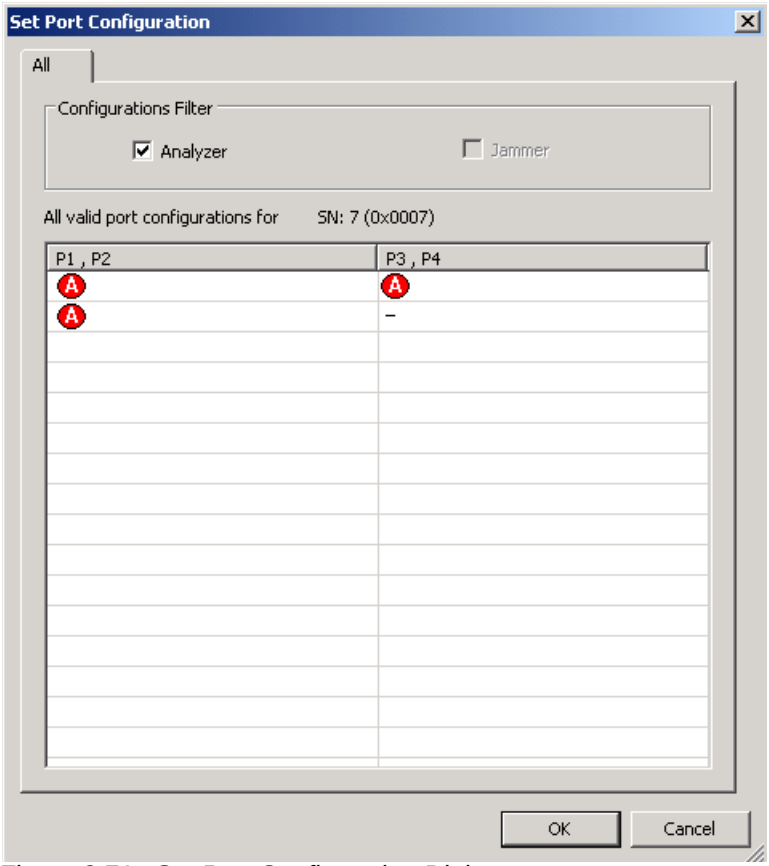


Figure 3.71: Set Port Configuration Dialog

Port Calibration

The Port Calibration dialog displays the Units and Ports Input and Output Signal parameters.

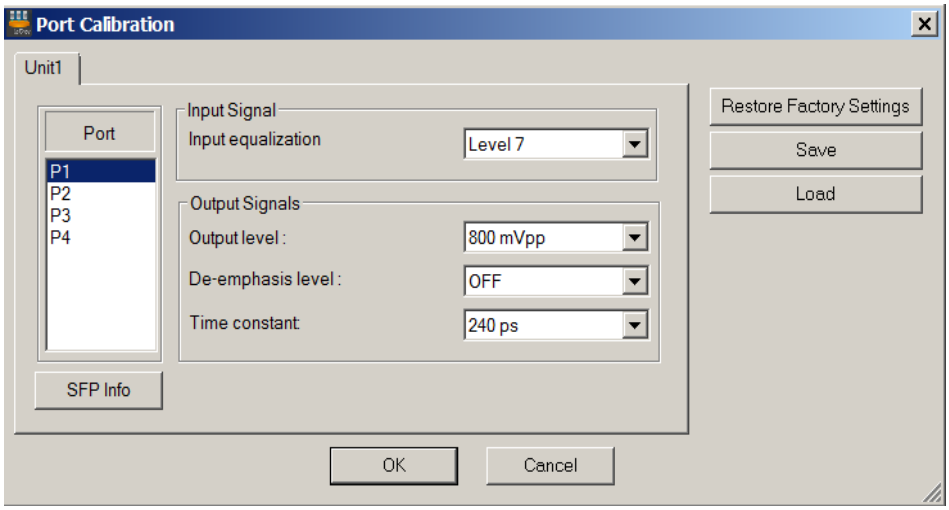


Figure 3.72: Port Calibration Dialog

To display the Port Calibration dialog, select **Configuration > Port Calibration**.

Input Signals have Input Equalization.

Output Signals have Output Level, De-emphasis Level, and Time Constant.

You can Save and Load the settings, or Restore Factory settings.

SFP Diagnostics

The SFP diagnostics provides the user insight into possible causes and allow to clearly and quickly diagnose a weak link failure due to bad cables or optics.

Click the **SFP Info** button to Refresh when changing SFPs. Also changing port selection will force a refresh (see Figure 3.72 on page 248).

Floating License

Note: This feature will be applicable in the future version of the software.

To manage the license, select **Configuration > License Manager**.

The Floating License dialog displays the available functionality by Function, Total Ports, Assigned To ports, and Not Used. It also displays the Current License Configuration by License Type, Serial Number, Analyzer and InFusion.

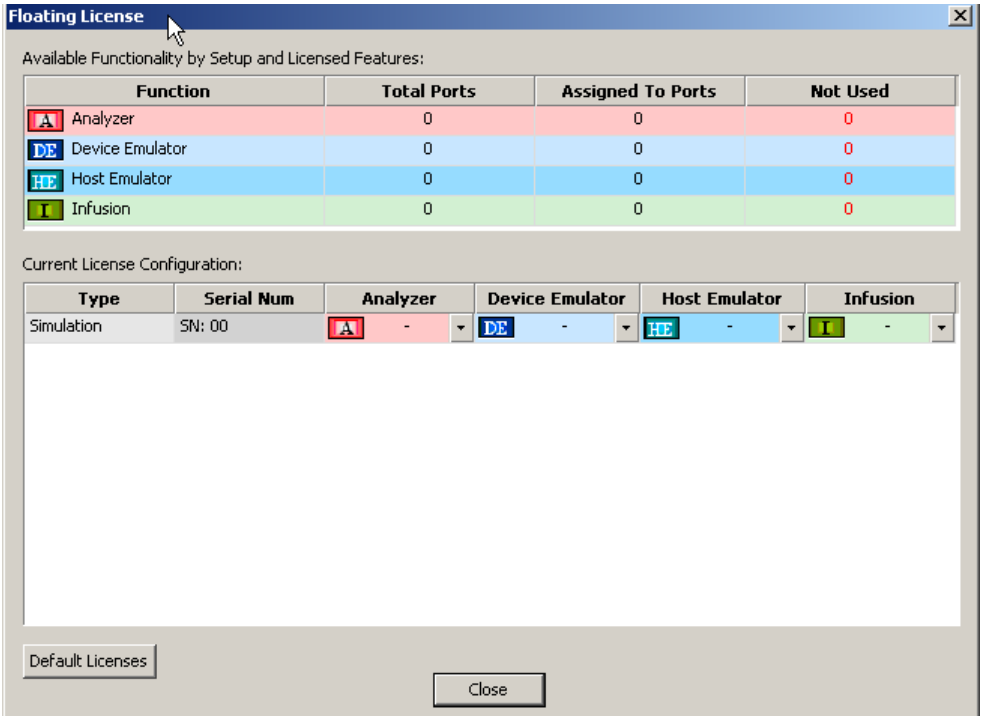


Figure 3.73: Floating License

Software Settings

Software Settings allow you to define template files for new Analyzer projects, to specify how sample files appear when opened, and to set Spec Assignment.

To perform software settings in an open sample view, select **Configuration > Software Settings (see** Figure 3.74 on page 250 and Figure 3.75 on page 251).

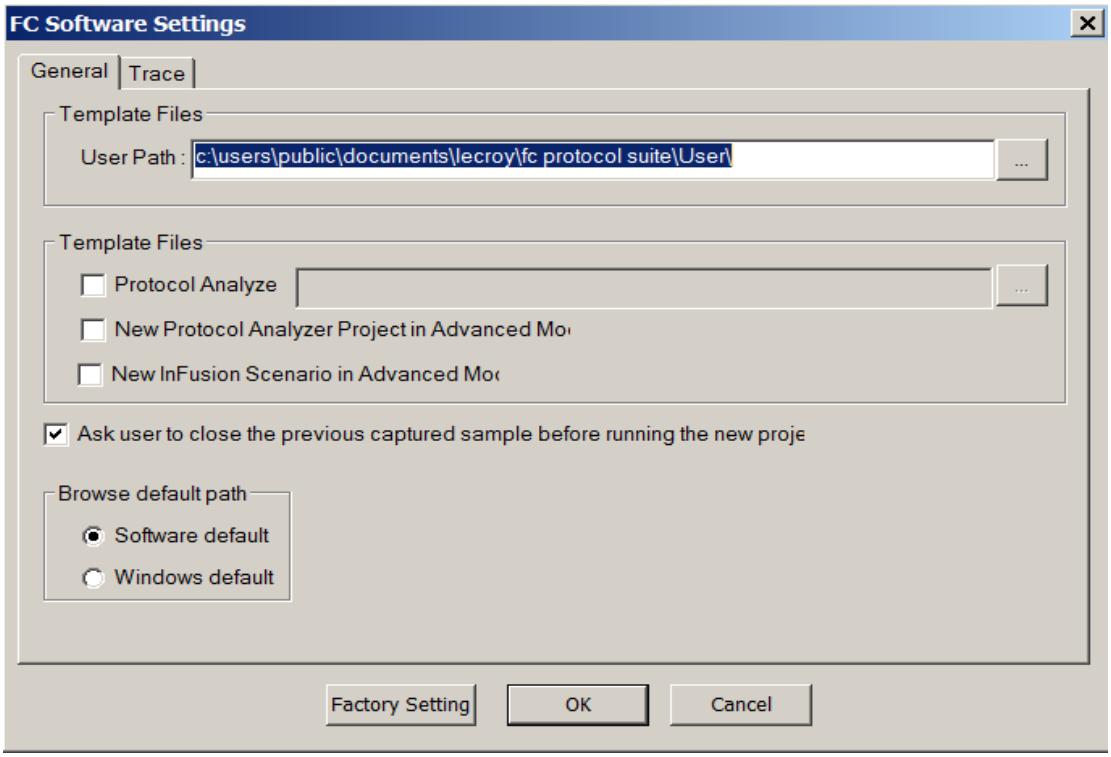


Figure 3.74: Software Settings Dialog General Tab

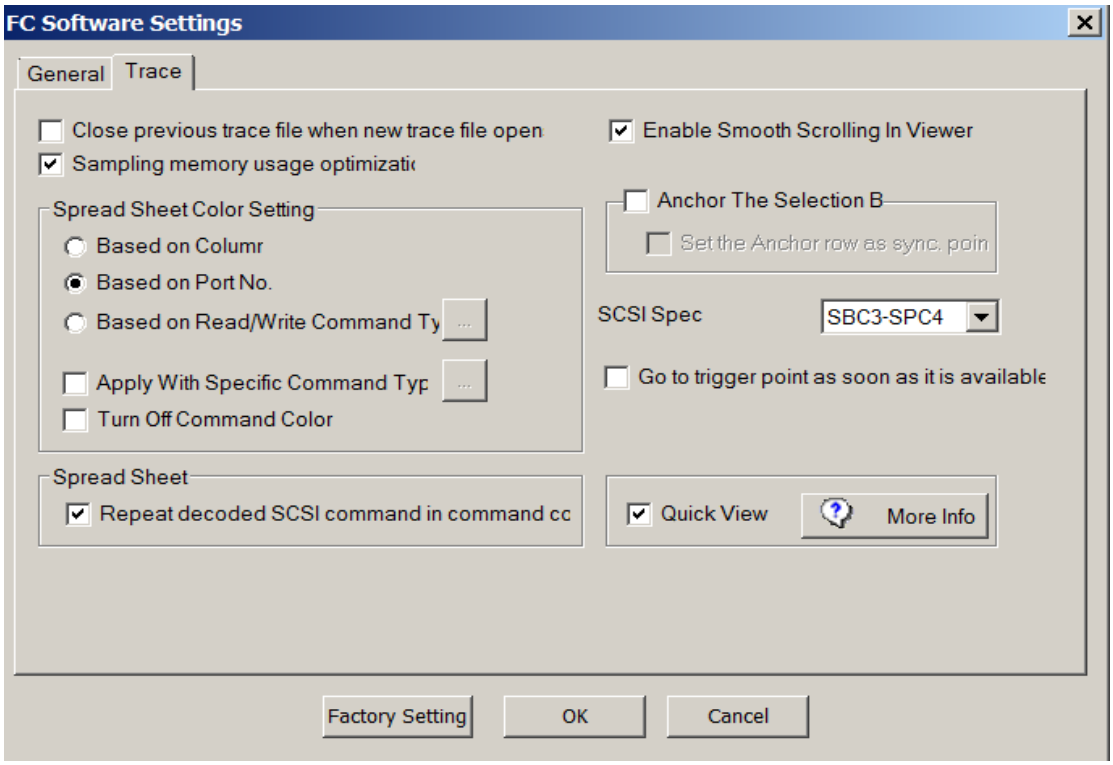


Figure 3.75: Software Settings Trace Tab

Set the options and click **OK**.

Sampling Memory Usage Optimization

The Software Settings dialog has a Sampling Memory Usage Optimization option. This Memory Assignment (MA) feature optimizes sampling memory utilization.

If the Sampling Memory Usage Optimization Option is Checked

The system tries to use empty space in all memory banks to prevent any memory bank from filling completely. Each physical link is not necessarily assigned to a specific memory bank. The system can capture more sample data than if the MA option is unchecked, and sample file size is closer to the user-defined Sampling Memory Size.

Memory Assignment efficiency varies with Port Configuration and Trigger Position:

- **FPGA**: The Memory Assignment feature works for a pair of ports connected to one FPGA, for example ports 1 and 2 (or ports 3 and 4). Memory Assignment does not work for two ports connected to different FPGAs, for example ports 1 and 3.
- **Triggering**: Memory Assignment only starts after the trigger point. During pre-trigger, each physical link is always assigned to a specific memory bank. Post-trigger, the system can try to use empty space in all memory banks, if you check the MA option. Therefore, Memory Assignment efficiency is maximum when Trigger Position is set to 0% (snap-shot trigger) and is minimum when Trigger Position is set to 99% or when there is no triggering (you stop recording manually).

Here are examples of different Port Configurations and Trigger Positions:

- **One port configuration (A-):** Sample size is user-specified sample size.
- **Two port pair configuration (A-)**: Ports 1⁄2 and 3⁄4 are on the same FPGA, so Memory Assignment has an effect. If you use snapshot triggering, the sample size is near specified size.
- **Two port pair configuration (A-):** If you use manual stop, Memory Assignment has no effect. Sample size depends on port traffic loads.
- **Two port pair configuration (A-)**: If trigger is set at 50%, and there is enough data to fill pre-trigger, Memory Assignment has an effect. Sample size is typically near specified size.
- **Two port pair configuration (A-)**: If trigger is set at 50%, but there is not enough data to fill pre-trigger, Memory Assignment has an effect. Sample size is typically more than half specified size, with size determined by the amount of data captured before trigger.
- **Two port pair configuration (AA)**: Ports 1⁄2 and 3⁄4 are not on the same FPGA, so Memory Assignment has no effect. If one port has heavy traffic, it may fill its memory bank and stop recording, resulting in smaller sample size than specified.

NOTE 1: Checking this option does not affect the sample. It only allows larger sample sizes.

NOTE 2: If traffic is balanced on ports, sample size is the same whether you check or uncheck the Sampling Memory Usage Optimization option.

NOTE 3: Memory Assignment depends on traffic load distribution at the time when the system tries to re-assign physical links to memory banks. Therefore, if you repeat a capture with the same Sampling Memory Size and Segment Number parameters, the resulting sample size may not be the same. However, if traffic load distribution is similar, sample size will be similar.

NOTE 4: The buffer status indicator shows buffer by FPGA, not by port.

If the Sampling Memory Usage Optimization Option is Not Checked

Each physical link (or logical link if MUX is enabled) is assigned to a specific memory space (memory bank), depending on the Sampling Memory Size and Segment Number parameters.

Important: If **any** physical link fills its memory bank, the recording process stops. Other memory banks will typically be less than full (and can be empty). The sample file might be smaller than the user-defined Sampling Memory Size. You might even think that the Analyzer malfunctioned.

Set Port Alias

Port Alias allows you to assign a meaningful name to each port to assist in interpreting the results displayed in the sample view.

To assign port names in an open sample view, select **Configuration > Set Port Alias**.

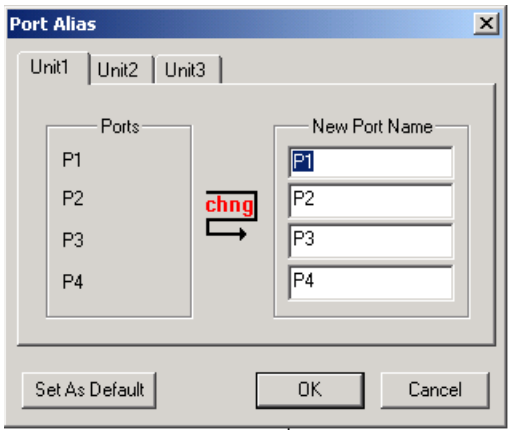


Figure 3.76: Assign Port Alias

Assign a meaningful name to each port for each unit in use and click **OK**. The assigned names replace the port numbers in the sample view.

If you elect to save the capture sample file, the assigned port names are saved together with the result, so that when you open the sample file later, the assigned names are retained.

Set As Default

If you want to set these port aliases for sample files that will be captured later, you can set them as default, and new samples will be opened by these default port aliases.

User-Defined Decoding

User-defined decoding allows you to create a definition file to interpret commands and frames that are not in the standard set recognized by the software.

Select **Configuration > User Defined Decoding** to open the User Defined Decoding dialog.

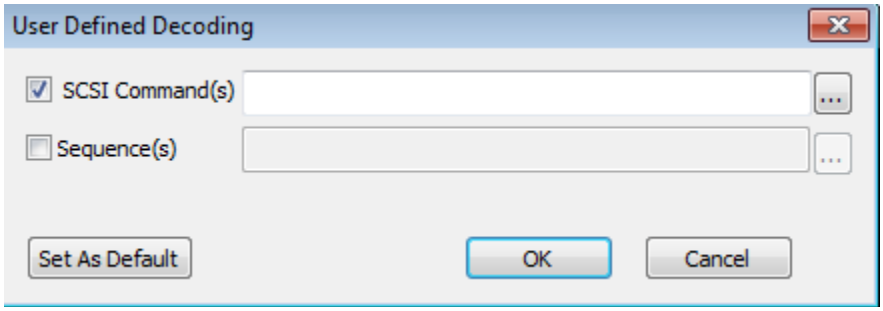


Figure 3.77: User Defined Decoding Dialog

Check **SCSI Command(s)** and/or **Sequence(s).** Click the ellipses next to a command type text box to display the **Open** dialog. Choose an appropriate script file and click **Open**.

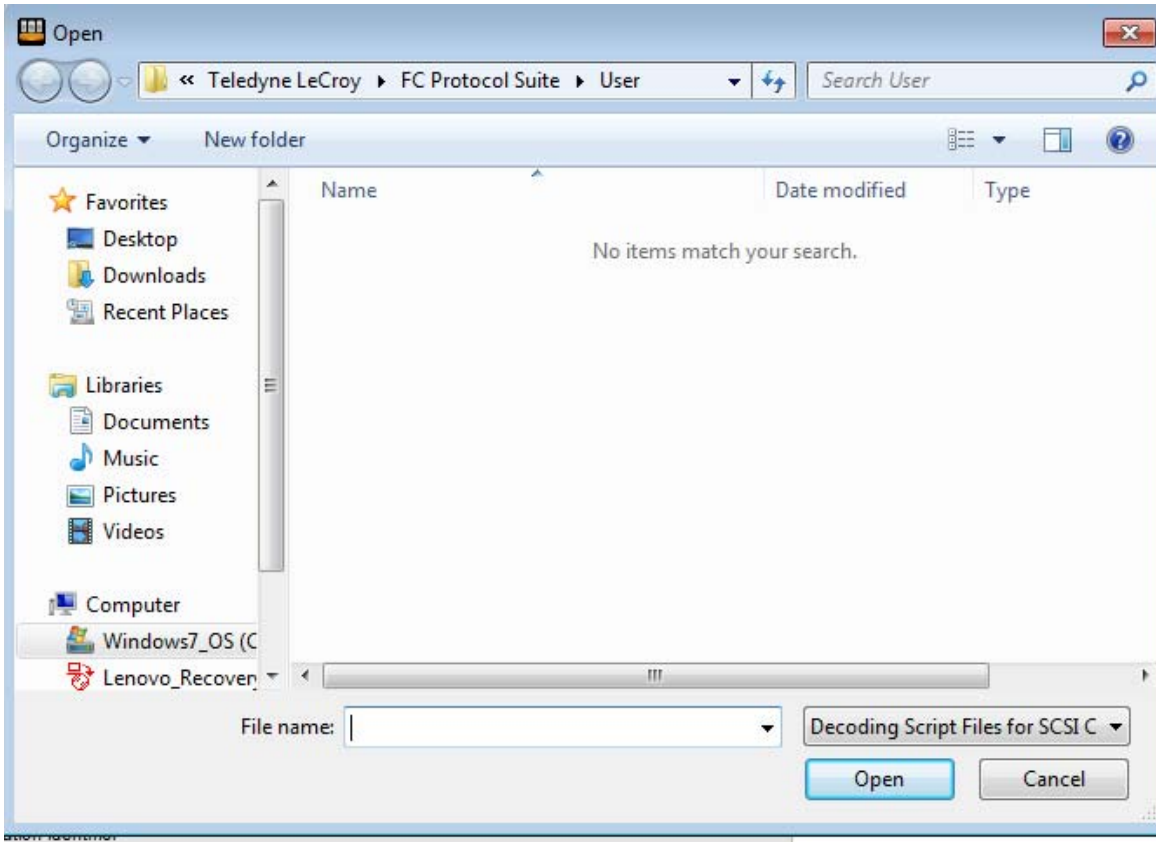


Figure 3.78: Choosing a Script File

External Trig Setting

The External Trig Setting dialog displays the External Trig Out Setting and External Trig In Setting as High Active, Low Active, or Toggle.

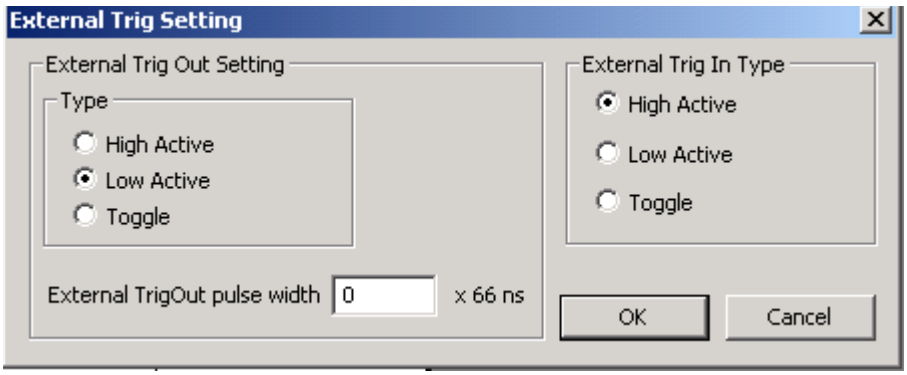


Figure 3.79: External Trigger Setting Dialog

To display the External Trig Setting dialog, select **Configuration > External Trig Setting**.

External Trig Out Setting
The Analyzer can send a Low or High external signal anytime a trigger occurs. Select the External Trig Out Setting: High Active, Low Active, or Toggle from High to Low or Low to High once (3.3 V output).

Enter the External TrigOut pulse width.

External Trig In Setting
An external Low or High input signal can cause triggering. Select the External Trig In Setting: High Active, Low Active, or Toggle from High to Low or Low to High once (3.3 V output).

Note: The nominal External Trigger voltage is 0.818 volts. Trigger In can work with 1 volt to 5 volts input voltage.

Update Sierra Device

The Update Sierra Device command allows you to update a SierraFC M164 Analyzer whose current version is incorrect.

1. Click **Configuration > Update Sierra Device** to display the Device Setup dialog.

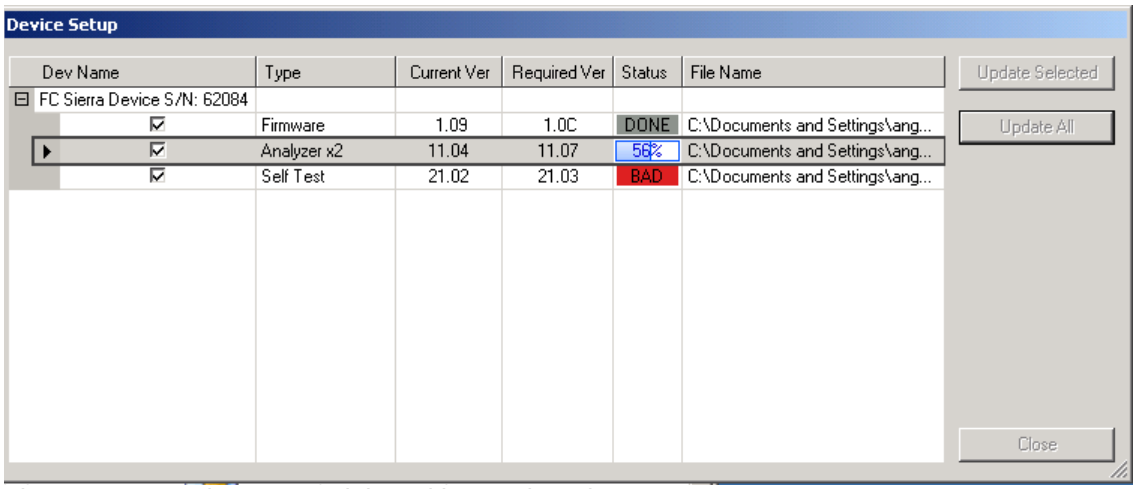


Figure 3.80: Device Setup Dialog with a Bad Device Status

Devices whose version is correct have an OK status in a green box.
A device whose version is incorrect has a BAD status in a red box.

Note: You can click the ellipses (...) at the end of a file path and name to display an Open dialog, in which you can browse for files.

2. Click the checkbox to the left of a device with BAD status, then click **Update Selected** to begin the process that will make the Analyzer version correct.

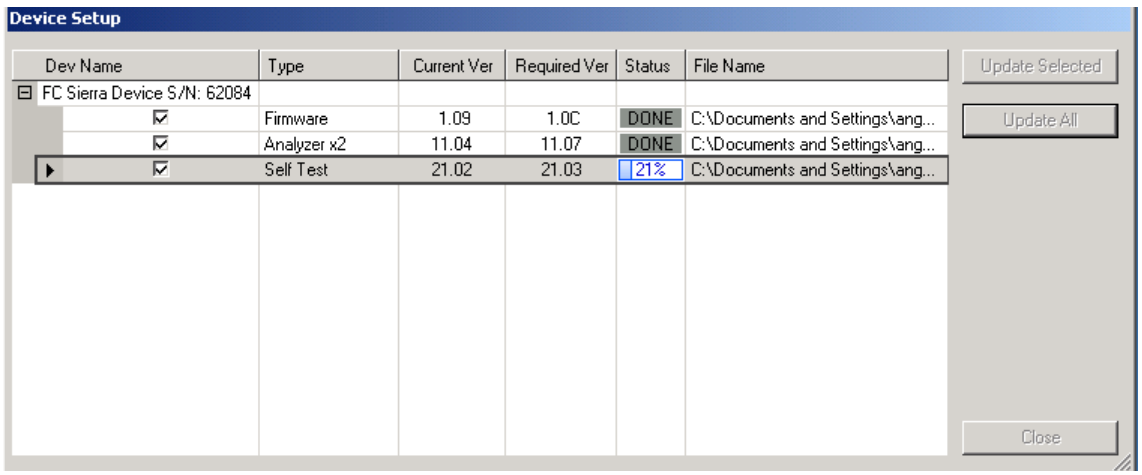


Figure 3.81: Device Setup Dialog Beginning to Update Status of a Device

After the update, the device must restart.

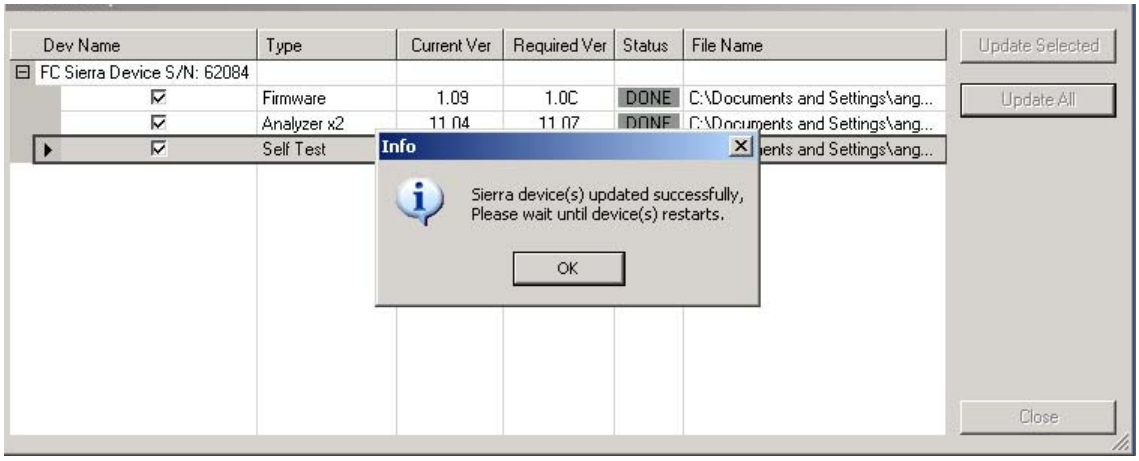


Figure 3.82: Info Dialog

Then the update is complete.

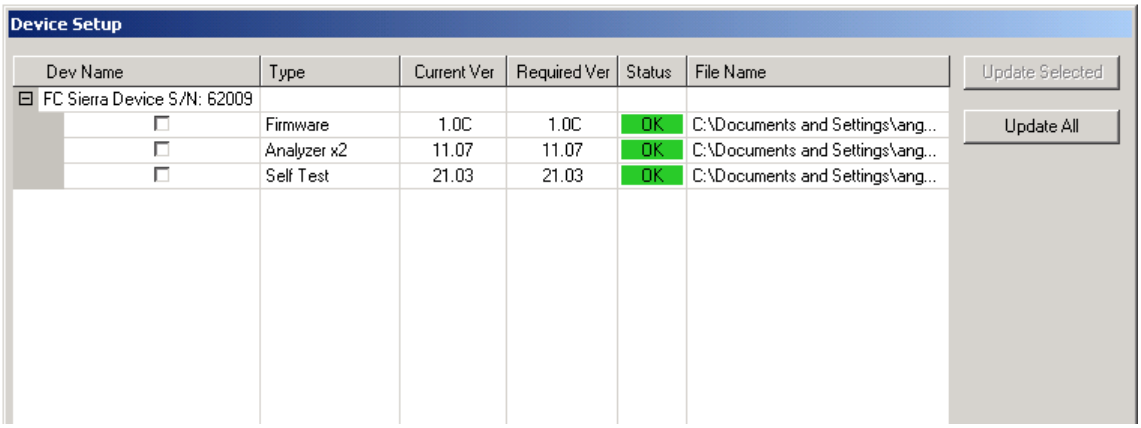


Figure 3.83: Device Setup Dialog with OK Device Status

Setup IP

This section describes the connectivity procedure for the SierraFC M164 System.

Connecting the SierraFC M164 to a Host Machine System Over Ethernet

SierraFC M164 Systems are designed to connect to host machines using a network connection, which allows the user to control the SierraFC M164 System from a local or remote host machine.

To connect via USB refer to “Connecting Via USB” on page 27.

Configuring the System

There are two ways of configuring a SierraFC M164 for network connectivity:

- **DHCP** automatically assigns an IP address. DHCP is the default.
- **Static IP** prompts you to enter a specific IP address.

The SierraFC M164 can be configured from the unit itself using the five buttons and the LCD display on the front panel of the analyzer. For additional information, see “LCD Display and Button Functions for Configuring the Analyzer” on page 14.

Dynamic Configurations

Dynamic configuration uses DHCP (Dynamic Host Configuration Protocol).

Under DHCP, SierraFC M164 will issue a broadcast to any DHCP Server requesting configuration. If a DHCP server is present on the network, it will assign an IP address, Subnet Mask and a default GATEWAY (a router port IP address) to the SierraFC M164. The Gateway port will be used by SierraFC M164 to forward packets to IP addresses that do not reside within the same subnet.

When using the dynamic configuration, the front panel display will only update the IP address.

The subnet mask and gateway address will remain at the last values programmed

(000.000.000.000 by default, or whatever was last programmed in the static configuration). While in dynamic mode, these parameters will have actually been programmed within the IP STACK inside the SierraFC M164, but are not displayed in the LCD display.

To change from DHCP to Static IP, you must be connected to a device using USB:

1. Select **Configuration > Setup IP** from the menu bar

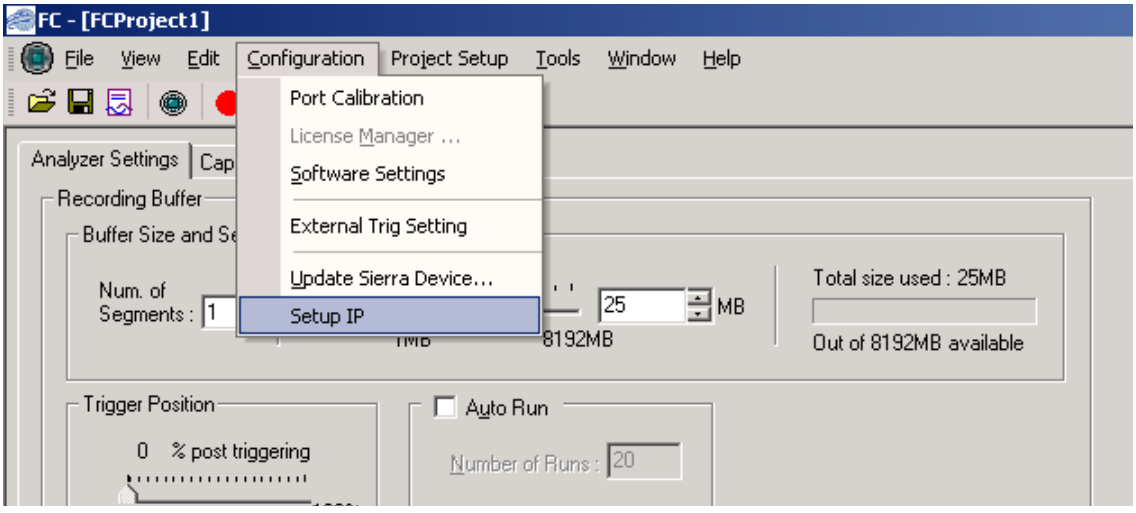


Figure 3.84: Configuration Menu with Setup IP Command

Note: If you are connected to the device using Ethernet, the Configuration menu does not have the Setup IP command.

The IP Setting dialog displays. For IP Mode, two radio buttons are available: Static IP and DHCP. DHCP is the default.

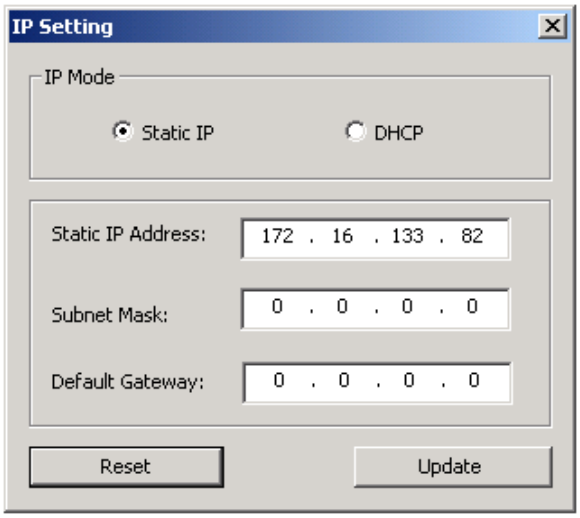


Figure 3.85: Static IP Setup Dialog

Static Configurations

Within static configurations, SierraFC M164 must be manually programmed with an IP address, Subnet Mask and a default GATEWAY.

Once SierraFC M164 has been programmed with the static network configuration, it will broadcast a UDP message on its own subnet stating that is on line and available for connection.

Note: This broadcast is only on the subnet that includes the SierraFC M164 System.

When the application is started on the host machine, it will broadcast a UDP message on its own subnet asking all SierraFC M164s available to identify themselves.

Note: This broadcast is only on the host machine's subnet.

If the host machine and the SierraFC M164 System reside on the same subnet, they will see each other's broadcasts and the application will automatically populate the Select Device list.

2. To change to Static IP, click the **Static IP** radio button.
   Enter the **Static IP Address**.
   Enter the **Subnet Mask**.
   Click **Update**.
   The system displays a warning message.

Click **Yes** to get a success message.

Click **OK**. The message closes and the device resets.

3. To change back to DHCP, in the IP setup dialog, click the **DHCP** radio button, then click **Update.**

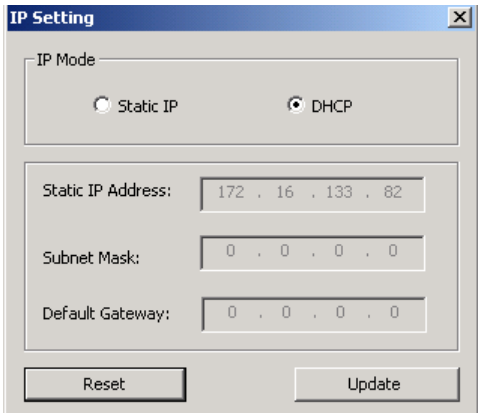


Figure 3.86: Dynamic IP Setup Success Message

After you see the Warning Message, click **Yes**

After you see the Success Message, click **OK**.

Note: You can also click **Reset**.

Ethernet Connectivity Through a Different Subnet

If you have multiple subnets and would like to connect the Analyzer over a subnet where the DHCP server is on a subnet different from the host machine or the analyzer or if the host machine and the SierraFC M164 System do not reside on the same subnet, they will not see each other automatically. The SierraFC M164 IP address must be added manually. Perform the following steps:

1. Launch the application and click the Ethernet radio button.
2. Click **OK**.

3. Click on **Add Device** in the Select Device dialog.

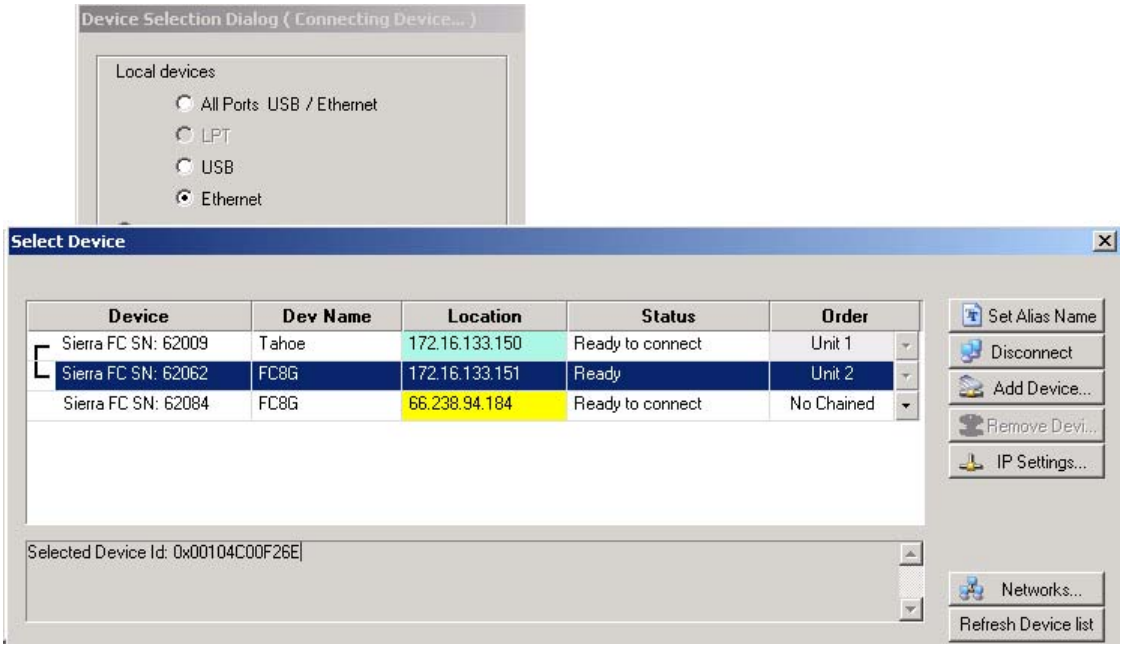


Figure 3.87: Select Device Dialog to Add New Device

4. The Add Device with Static IP displays. Enter the IP address to add the device.

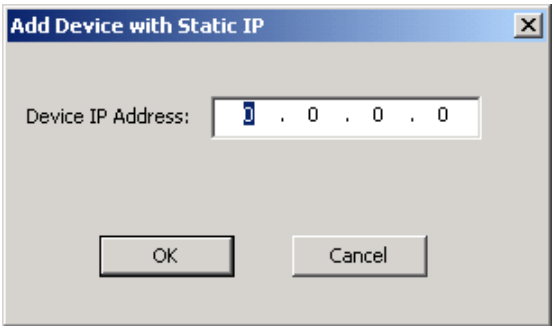


Figure 3.88: Add New Device with Static IP Address

Once the IP address is added, the application will then send a connection request to that IP address to connect to the SierraFC M164 System.

Set Address Alias

Address Alias allows you to assign a meaningful name to each address to assist in interpreting the results displayed in the sample view. To assign address names in an open sample view, select **Configuration > Set Address Alias** (see Figure 3.89 on page 262).

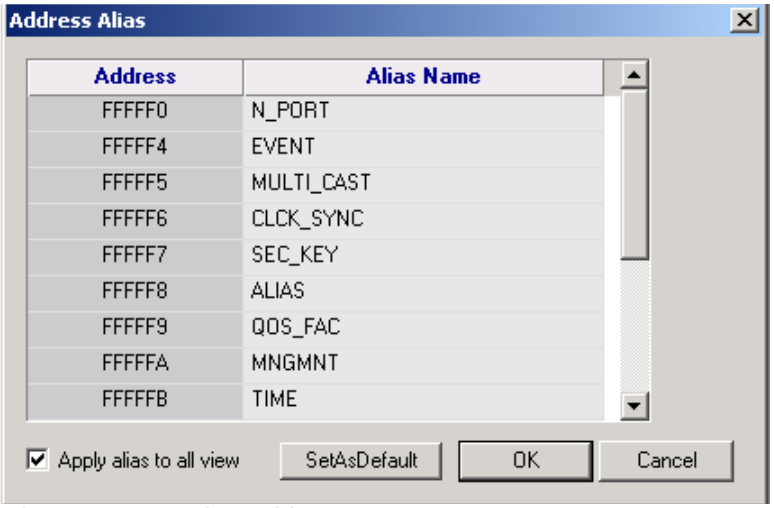


Figure 3.89: Assign Address ID

Assign a meaningful name to each address in use and click **OK**. The assigned names replace the address in the sample view, Search, filter,. and Statistical Report.

If you elect to save the captured sample file, the assigned address names are saved together with the result, so that when you open the sample file later, the assigned names are retained.

Set As Default

If you want to set these address aliases for sample files that will be captured later, you can set them as default, and new samples will be opened by these default address aliases.

All Connected Devices

See "Select Device" on page 23 for information.

Help Menu

Help Topics

Displays online help. You can also select F1.

VSE Help Topics

Displays online help. You can also select F1.

Update License

A current license agreement with Teledyne LeCroy entitles the Analyzer owner to continued technical support and access to software updates as they are published on the Teledyne LeCroy website. When you obtain a license key, from the Help menu select Update License to display the Select License Key File dialog box. Enter the path and

filename for the license key, or browse to the directory that contains the license key and select the *.lic file. Click Open.

Display License Information

Open a license information dialog to display a list of named features supported by the current software version Named features that are not enabled on your system are indicated by No in the Purchased column. Whether or not named features are enabled depends on the license key stored in your analyzer If you try to use a feature for which you do not yet have a license, the program displays the License Protection Message. To use the feature, you must purchase a license.

Check for Updates

Check whether a new software version is available. If so, you can download from the Teledyne LeCroy web site.
You can select to Check for updates at application startup.

About

Displays Teledyne LeCroy FC Protocol Suite software version information.

Chapter 4

FC InFusion

FC InFusion Overview

The Teledyne LeCroy FC InFusion™ Error Injector and Traffic Modifier is an error injector and traffic modification tool that allows you to verify real-world fault handling for Fibre Channel systems. FC InFusion can sit unobtrusively in the data path on a live system to programmatically alter or corrupt traffic. FC InFusion is the ideal tool for stress-testing systems using actual workloads.

The following screen displays the window in FC InFusion mode.

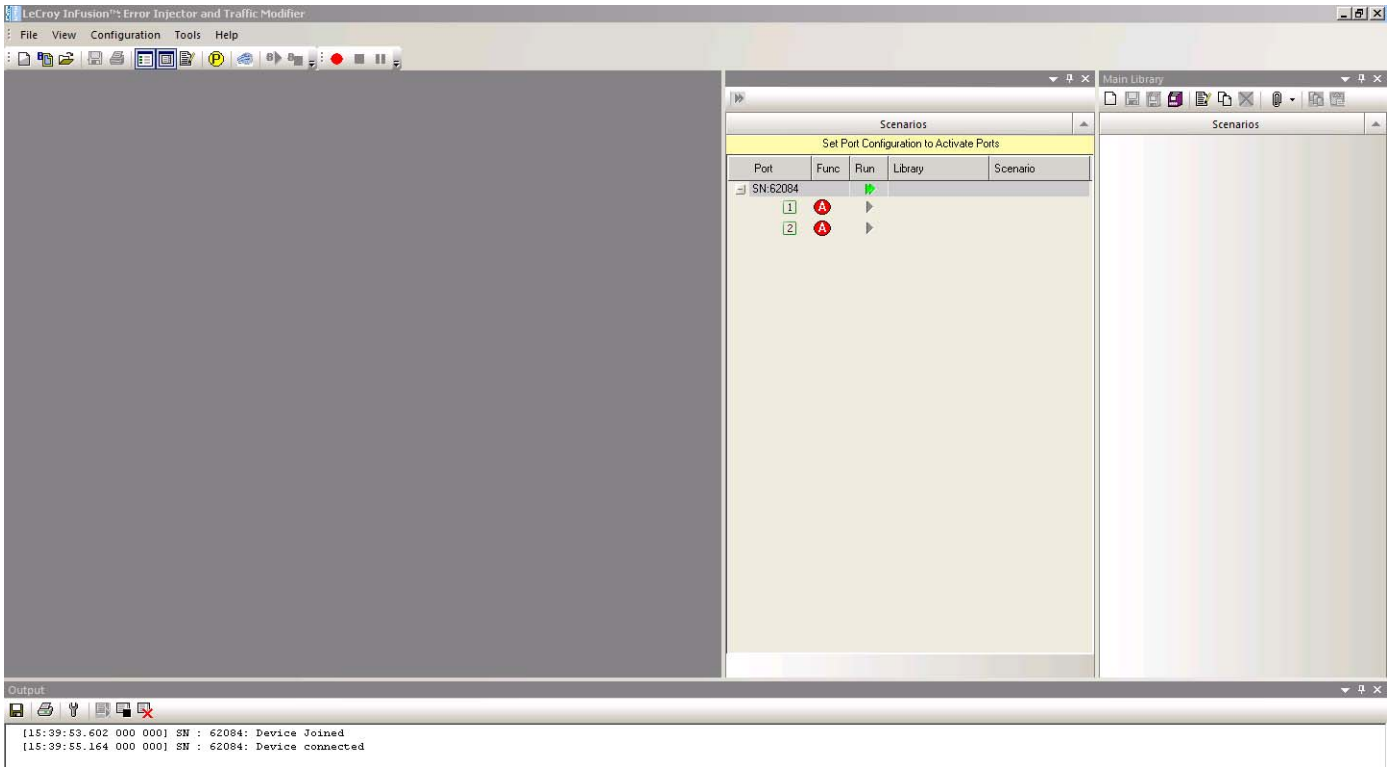

LeCroy InFusion™: Error Injector and Traffic Modifier
File View Configuration Tools Help
Scenarios
Set Port Configuration to Activate Ports
Port Func Run Library Scenario
SN:62084
Main Library
Scenarios
Output
[15:39:53.602 000 000] SN : 62084: Device Joined
[15:39:55.164 000 000] SN : 62084: Device connected

Figure 4.1: FC InFusion Windows

FC InFusion supports Fibre Channel link up to 16 Gbps. FC InFusion monitors traffic from both directions in real-time and relies on predefined rules to replace any bit, ordered-set, or parameter with one you specify. FC InFusion can change traffic when it detects a specific sequence or reaches a designated time interval, yet it requires no complicated scripts, programming, or simulation tools.

FC InFusion can monitor traffic in both directions and act on Events occurring in either direction of the communications link. FC InFusion can modify traffic in only one direction within a given test Scenario, but that direction can be either from the Originator or from the Responder.

FC InFusion is specifically designed to verify recovery characteristics within a subsystem. An easy, user friendly menu interface with icons and hyperlinks allows you to create specific test Scenarios in just minutes.

Once an FC InFusion session starts, the system automatically handles protocol handshaking between devices. FC InFusion transmits a faithful copy of the original data stream down to the CRC value which, if needed, it recalculates. FC InFusion allows test engineers to systematically verify error recovery in ways not possible with other test platforms.

Key Features

The key features of FC InFusion are:

- **Error Injection**: Injects CRC, disparity, 8b/10b encoding, framing, and coding errors.
- **Break Link Recovery**: Programmatically breaks the connection to test link recovery.
- **Value Replacement**: Monitors the link for specific values, patterns, or ordered-sets (as low as bit level) and replace with user-defined values. You can replace values on every occurrence, after a specified number of occurrences, or after a specified time interval.
- **Packet Drop**: Removes individual ordered-sets or frames from the stream to verify retry behavior.
- **Ordered-set Manipulation**: Replaces handshaking and flow control ordered-sets to help validate robustness of a design.
- **Traffic Monitoring:** Operates as a traffic monitor, collecting statistical data on user-specified parameters. In this mode, data passes unchanged in both directions.
- **Menu-Driven Interface:** Allows easy set-up of test Scenarios.
- **API based on C++:** Allows development of custom test applications.
- **Scenario Batch Files:** Allows using scripts to run multiple Scenarios in a batch.

With respect to traffic modification, in the Link Layer you can modify ordered-sets, CRC, scrambled data, and connection Events. You cannot modify clock skew management and signal integrity.

FC InFusion consists of a hardware device that connects to the line under test and a Windows-based software application used to create and download test scripts to the device. You also can use the software application to configure and control the device across an Ethernet or USB link.

FC InFusion test scripts are called Scenarios. Scenarios determine how the hardware device monitors and modifies line traffic. In order to create and download Scenarios the Teledyne LeCroy FC InFusion Protocol Suite application must be used.

For the FC InFusion connections, the device is connected between the Fibre Channel host and the PHY of the test responder (DUT).

Interface

Buttons

The FC InFusion interface has the following command buttons:

New Scenario: Begins the Scenario creation process by listing Scenario Name, Direction for traffic changes, Max Removable DWORDs per Scenario Run and Global Rules in the Scenario window.

New Batch Script: Starts a Scenario batch file in Batch Script window.

Open: Opens an existing supported file. Lists the FC InFusion Library Files (**.**ifc), which contain the available Scenarios, in an Open dialog. Batch Script Files (.bth) and Library Files (.ifc) are supported.

Save: Saves the current Scenario in the UserData folder.

Print: Prints the current Scenario.

Show Library: Displays/hides the Main Library window (on the right), which displays the available Scenarios. You can create a New Scenario, Save a selected Scenario, save the Library, Save a Copy of the Library, display the selected Scenario, insert a copy of the selected item, or delete the selected Scenario.

Show Output: Displays/hides the Output window (at the bottom), which displays FC InFusion output. Use the buttons to save output, print output, display options (automatically save the log file, with a path and size), start logging, stop logging, and clear the Output window.

Show Port Assignment: Displays/hides the Port Assignment window.

Port Configuration: Displays the port configuration dialog. See “Port Configuration for FC InFusion” on page 272.

Show Analyzer: Returns to the Protocol Analyzer window.

Run Batch Script: Runs a Scenario batch file.

Stop Batch Script: Stops a running Scenario batch file.

Rec Analyzer: Starts recording on the current analyzer.

Stop: Stops recording on the current analyzer.

Abort: Aborts recording.

Menus

The FC InFusion interface has the following menus:

File (see command descriptions in the “Buttons” section above)

- New Scenario, Open Scenario
- Open an FC InFusion supported file (.IFC file, .ifc and .bth)
- New Batch Script, Save Batch Script As
- New Library, Close Library, Save Library, Save Copy of Library As
- Open Log File
- Print Setup
- Exit

View

- Views (Library, Output, Customize; see window descriptions in “Buttons” section above)
- Smart Docking
- Toolbar
- Status Bar
- Show Analyzer

Configuration

- Port Configuration (see “Port Configuration for FC InFusion” on page 272)
- External Trig Setting (see “External Trig Setting” on page 255)
- Batch Script Setting (see “Scenario Batch Files” on page 324)
- Update Sierra Device (see “Update Sierra Device” on page 256)
- All Connected Devices (see “Select Device” on page 23)

Tools: Browse UserData, System, or FC InFusion folder.

Help: Help Topics and About FC InFusion.

Scenario Windows (Main Library)

Two Scenario windows are displayed as shown below. A list of the Scenario is displayed in the right Scenarios panel. A solid orange box implies a warning, a solid red box indicates an error, a solid green box indicates a valid scenario and an empty green box denotes no Events are defined for that Scenario.

You can select a **Library** and **Scenario** in the **Port Assignment** panel on the left. Refer to Figure 4.34 on page 320 for details on selecting the library and scenario. You can set Port Configuration to activate ports in the left Scenarios panel (see Figure 4.2).

Refer to “Port Configuration for FC InFusion” on page 272 for more information.

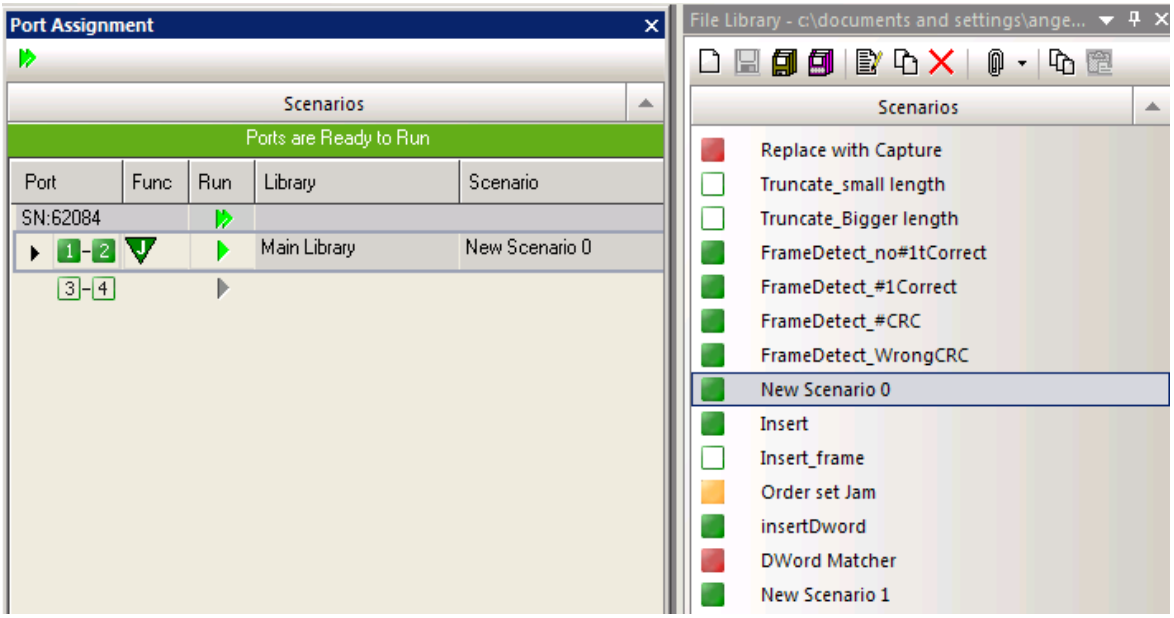


Figure 4.2: Scenario Windows

After activating the Port you can run it by clicking the green arrow. A black rectangle **Stop** button will display. Press the black button to stop running the Scenario (see Figure 4.4 on page 270).

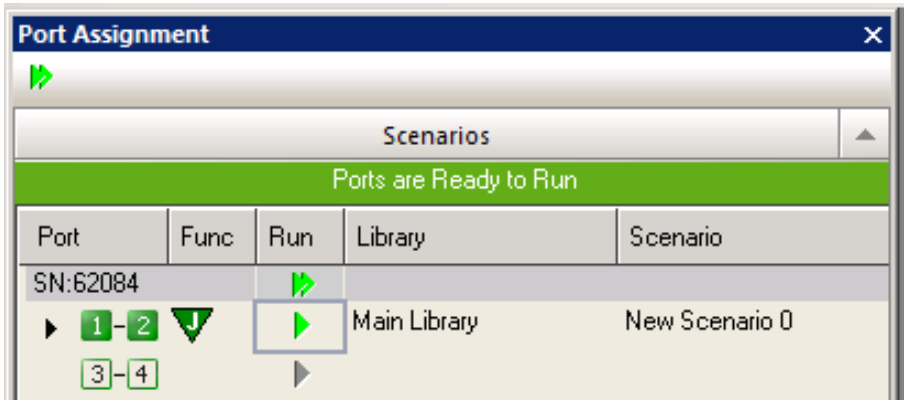


Figure 4.3: Running a Scenario

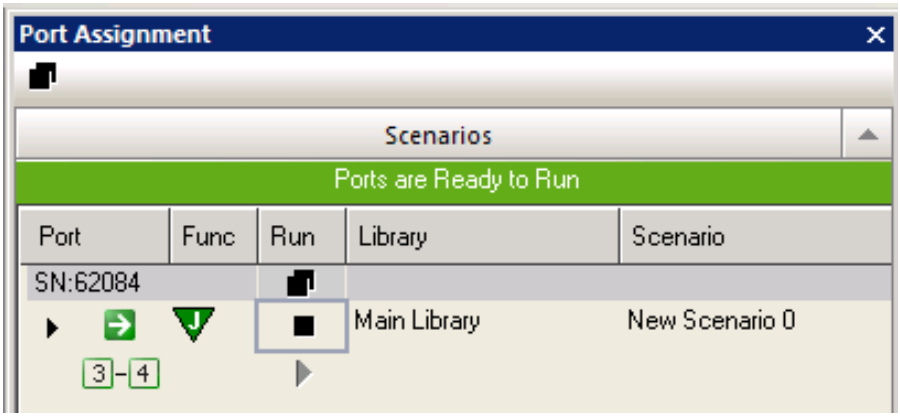


Figure 4.4: Stopping a Scenario

Using the icons on the right Scenarios panel, you can:

Create a Scenario

Save a selected Scenario

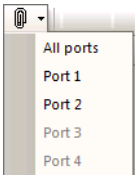
Save a library

Save a copy of the library

View or edit a selected item

Insert copy of the selected item

Delete a selected Scenario



Assign Scenario to Device Ports

Copy and paste Scenarios

Using the Scenarios panel on the left you can run or stop each port or all ports.

Note: A Scenario row pertaining to a port is grayed-out when that port has not been configured to be a Jammer in the Port Configuration dialog (see "Port Configuration for FC InFusion" on page 272).

Library

The **Main Library** pane is displayed on the right of the screen**.**

.

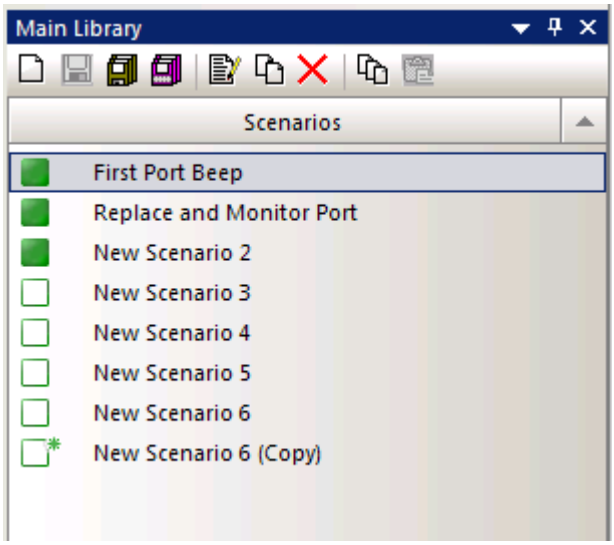


Figure 4.5: Main Library

All the Scenarios that are created are displayed in the Main Library panel.

Port Configuration for FC InFusion

Select **Configuration > Port Configuration** or click the Port Configuration icon to display the Set Port Configuration dialog, or press the yellow ‘P’ icon.

To record traffic both before and after the FC InFusion modifies (jams) it, select **Analyzer/Jammer/Analyzer** on the port that you want to jam. In the following figure, there is a match on Port 2.

Note: In Analyzer/Jammer/Analyzer **(**AJA) port configuration the LEDs for ports 3 and 4 represent ports 1 and 2 post-jam. The LEDs for ports 3 and 4 do not turn off when they are disconnected.

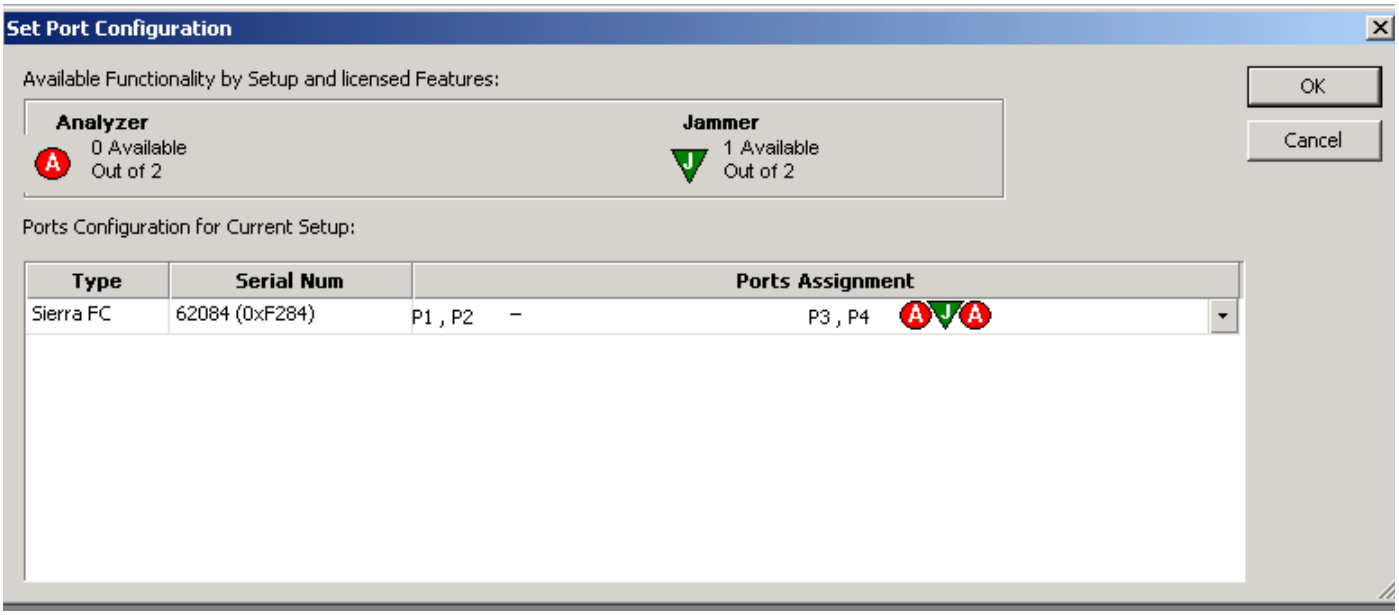


Figure 4.6: Ports Configuration Dialog with Analyzer/FC InFusion/Analyzer Port Match

Note: You can select only one Jammer port at a time when using the AJA configuration.

To record traffic from other ports after the FC InFusion modifies (jams) them, select a combination of ports that have **Jammer/Analyzer** specified under them. The different configurations accommodate different possible user setups and requirements.

Note: To display the current Port Configuration, click **Show Analyzer** to go to the analyzer application, then click the green button in the lower right corner to display the Port Status window (see “Port Status” on page 202).

Important Information for Jammer and Analyzer

Jammer intercepts and delays traffic on both directions simultaneously, so Originator sends to Jammer, Jammer delays and sends to Responder, Responder sends to Jammer, Jammer delays and sends to Originator. However, Jammer modifies traffic in one direction only: from Originator to Responder, or from Responder to Originator.

When using Jammer and Analyzer, the Select Port Configuration dialog has options JA as shown in Figure 4.7.

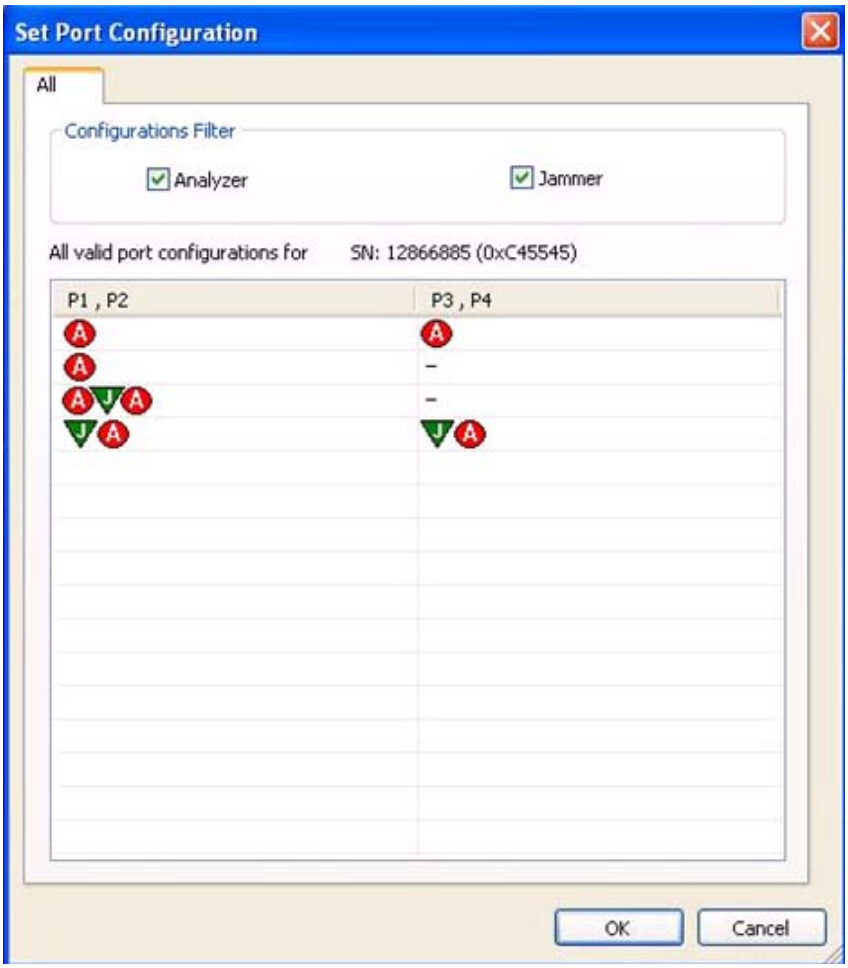


Figure 4.7: Select Port Configuration Options with Jammer and Analyzer

When AJA port configuration is selected, the user MUST connect P2 to P3 directly (externally) and the other ports should be connected to the FC ports being jammed. In this configuration, P1/P4 shows before jam traffic and P2/P3 shows after jam traffic. As a result, the capture/trigger resource of ”Request, Reply” should only be used considering the effect of the Jammer (delay, modification and jamming).

FC InFusion Scenarios

You can create and execute FC InFusion Scenarios. A Scenario is a test script that defines how FC InFusion monitors and modifies line traffic.

Scenarios Overview

You create Scenarios on a PC running the FC InFusion application. You then specify the Scenarios for execution on an FC InFusion device.

The FC InFusion application provides a user friendly interface for building Scenarios. The interface prompts you for simple decisions and choices from drop-down menus, icons and hyperlinks. As you make your selections, the script takes shape automatically in the Scenario window. The script is in the form of simple English sentences. You need not understand any formal scripting language.

Scenarios can be created in two modes, Simple Mode and Advanced Mode. The Advanced mode has additional functions that enable creation of Scenarios with Global Rules, Sequences and States which offer significant flexibility. Since Advanced is a superset of Simple, you can switch to Advanced, and get an identically functional scenario. Switching from one mode to the other is easy (see Figure 4.8 on page 275). However, when switching from Advanced to Simple, the application may still use some Advanced Mode features. We recommend that you do not switch from Advanced to Simple but start with a fresh Scenario in Simple Mode after saving the Advanced Mode Scenario.

The following screen displays when you create a Scenario in Simple Mode.

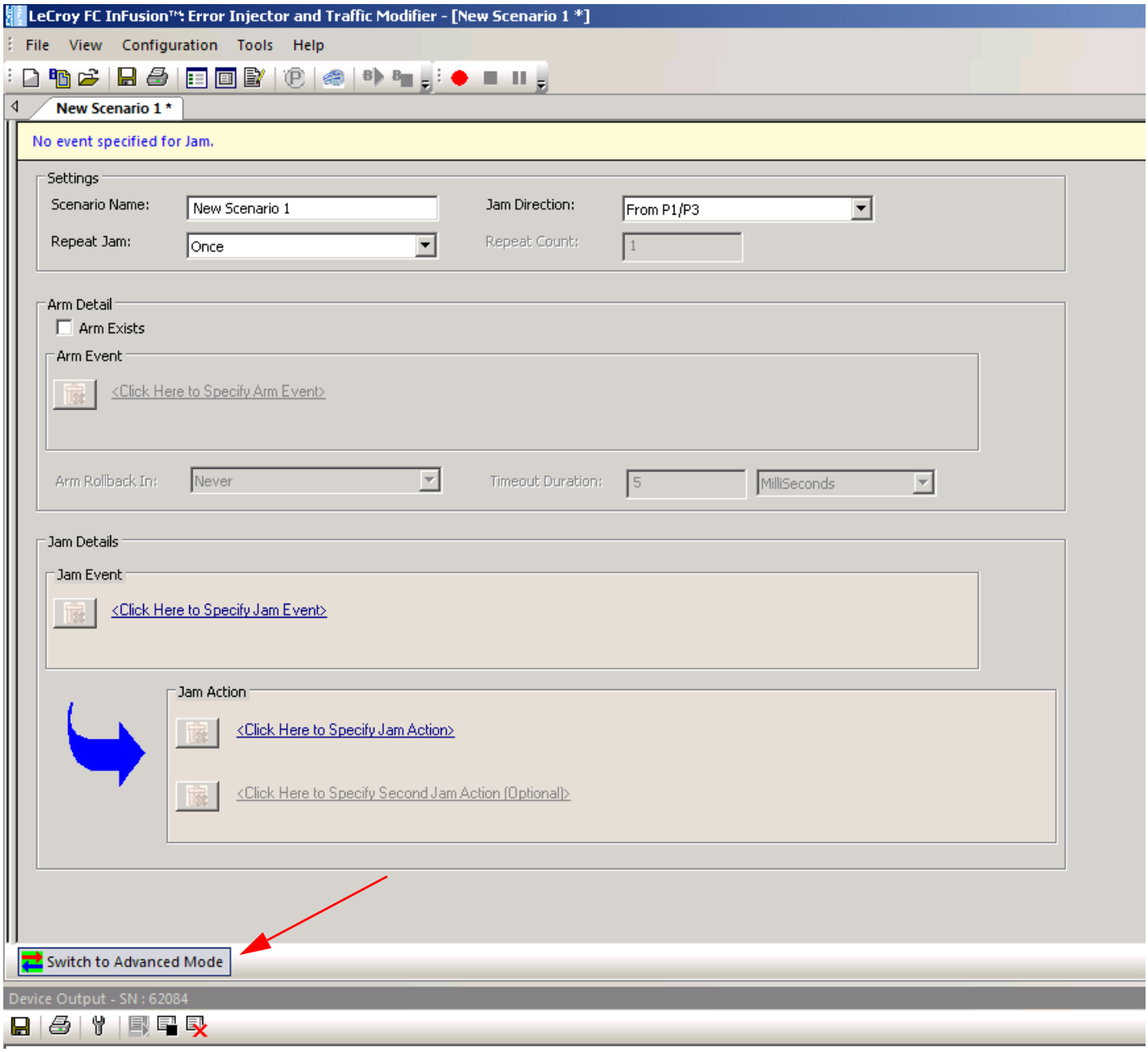


Figure 4.8: New Scenario in Simple Mode in the FC InFusion Window

Settings in Simple Mode

The following settings can be made to create a Scenario in Simple Mode:

Settings

The following settings can be made in Simple Mode:

- **Scenario Name**: Give a name to the Scenario
- **Jam Direction**: Select **From Originator** or **From Responder**
- **Repeat Jam**: From the drop-down menu select **Forever, Once** or **Specific Count.** The default is **Once.**
- **Repeat Count**: Key in the Repeat Count in the field.
- **Arm Detail:** Arm Detail is explained below.
- **Jam Detail:** Jam Detail is explained below.

Arm Detail

Check the **Arm Exists** checkbox if the Arm Detail is to be set. If the **Arm Exists** checkbox is checked, you can specify an **Arm Event** by clicking on the **<Click here to Specify Arm Event>** link. The Events and their descriptions are listed in Table 4.1 on page 277.

An Arm Event is an Event that you want to “arm” the Jammer with. When the Jam Event happens, the Jam Action will only happen if the Jammer was previously armed by the Arm Event.

- Arm Rollback In: You can select **Never** or **After Specific Duration.** The default is **Never.** The Arm Rollback is a timeout timer, that resets the ‘hunt’ for the Jam Event back to the Arm Event if the specified timeout expires
- Timeout Duration: If **After Specific Duration** is selected, you can specify the duration by entering a value in the fields. You can select from Seconds, MilliSeconds or Microseconds.

Note: You can select “**Link Speed, Both Linkup and Protocol Errors**” from the Arm Events Patterns Library since these Events are applicable only for “Arm Events”. None of these Events are available for “Jam Events” in Simple Mode.

Jam Details

- Jam Event: Set a Jam Event by clicking on the **<Click here to Specify Jam Event>** link. The Events and their descriptions are listed in Table 4.1 on page 277.
- Jam Action: Set a Jam Action by clicking on the **<Click here to Specify Jam Action>** link. After the first Jam Action has been specified you can set a consequent Jam Action by clicking the **<Click here to Specify Second Jam Action [Optional]>** link. The Jam Actions and their descriptions are listed in Table 4.1 on page 277.

Table 4.1 on page 277 describes the Presets that can be used as Events in the Simple Mode.

Note: To go to the Advanced Mode click on the Switch to Advanced Mode button. See "Settings in Advanced Mode" on page 282.

TABLE 4.1: Simple Mode Events and their Descriptions

Event	Description
User Patterns	
Most Recent	Lists the most recent Events.
New User Group	Lists the new user groups.
Presets	
Timers/External	
Timer	The Event occurs when the timer expires.
Other Trigs	Analyzer: the Event occurs when the Analyzer triggers. External: the Event occurs when the external Trigger In is asserted.
Basic	
Ordered Set	Refer to section "Ordered Set" on page 49.
Basic Link Service	Refer to section "Basic Link Service" on page 50.
Link Control Frame	Refer to section "Link Control Frame" on page 51.
Link Speed	The Event occurs when the link is at the specified speed.
Both Linkup	The Event occurs when both ports are out of electric idle.
Dword Matcher	Refer to section "Dword Matcher" on page 299.
Symbol 16G	
Training Sequence	**Inject Error on Control**: Generates Manchester Coding violation on Control field bits corresponding to the defined mask: One means violation, and zero means no error. **Inject Error on Status**: Generates Manchester Coding violation on Status field bits corresponding to the defined mask: One means violation, and zero means no error. **Frame Marker Error**: Generates training sequence with an invalid frame marker. **Recode Manchester Coding**: Forces jammer to recalculate Manchester Coding for each bit of training frame.
FCP	
FCP SCSI Command	Refer to section "FCP SCSI Command" on page 52.
FCP Frame Information Unit	Refer to section "FCP Frame Information Unit" on page 53.
SCSI Command Status	Refer to section "SCSI Command Status" on page 54.
FCP Task Management	Refer to section "FCP Task Management" on page 55.
ARB	
ARB Loop Initialization	Refer to section "ARB Loop Initialization" on page 56.
ELS	
Extended Link Service-Request	Refer to section "Extended Link Service - Request" on page 57.

Event	Description
Extended Link Service- Request, Reply	Refer to section "Extended Link Service - Request, Reply" on page 58.
Extended Link Service- Reply	Refer to section "Extended Link Service - Reply" on page 59.
GS	
Generic Link Service- Request	Refer to section "Generic Link Service - Request" on page 60.
Generic Link Service- Request, Reply	Refer to section "Generic Link Service - Request, Reply" on page 61.
Generic Link Service- Reply	Refer to section "Generic Link Service - Reply" on page 62.
SW	
Switch Internal Link - Request	Refer to section "Switch Internal Link Service - Request" on page 63.
Switch Internal Link - Request, Reply	Refer to section "Switch Internal Link Service - Request, Reply" on page 64.
Switch Internal Link - Reply	Refer to section "Switch Internal Link Service - Reply" on page 65.
FICON	
FICON (Any Data Information Block Type)	Refer to section "Any Data Information Block Type" on page 66.
FICON (Data)	Refer to section Refer to section "Add FICON Data" on page 67. .
FICON (Command)	Refer to section Refer to section "Add FICON Command" on page 68. .
FICON (Status)	Refer to section Refer to section "Add FICON Status" on page 70. .
FICON (Control)	Refer to section Refer to section "Add FICON Control" on page 73. .
FICON (Command-Data)	Refer to section "Add FICON Command-Data" on page 75.
FICON (Link-Control)	Refer to section "Add FICON Link-Control" on page 77.
FCAE 1553	
FCAE - ASM	Refer to section "FCAE-ASM" on page 79.
FCAE 1553 (Any)	Refer to section "FCAE-1553 Any" on page 80.
FCAE 1553 (Data)	Refer to section "Add FCAE-1553 Data" on page 81.
FCAE 1553 (Command)	Refer to section "Add FCAE-1553 Command" on page 82.
FCAE 1553 (Status)	Refer to section "Add FCAE-1553 Status" on page 85.
FCAE RDMA	

Event	Description
FCAE-RDMA FCP SCSI Command - With Target Notification	Refer to section "FCAE-FCP SCSI Command - RDMA With Target Notification" on page 86.
FCAE-RDMA FCP Command Frame Information Unit With Target Notification	Refer to section "FCAE RDMA FCP Command Frame Information Unit With Target Notification" on page 87.
FCAE-RDMA FCP SCSI Command - Without Target Notification	Refer to section "FCAE-RDMA FCP SCSI Command Without Target Notification" on page 88.
FCAE-RDMA FCP Command Frame Information Unit Without Target Notification	Refer to section "FCAE RDMA FCP Frame Information Unit Without Target Notification" on page 89.
FCVI	
FCVI(Any)	Refer to section "FCVI(Any)" on page 90.
FCVI(SEND_RQST)	Refer to section "FCVI(SEND_RQST)" on page 90.
FCVI(WRITE_RQST)	Refer to section "FCVI(WRITE_RQST)" on page 90.
FCVI(READ_RQST)	Refer to section "FCVI(READ_RQST)" on page 90.
FCVI(SEND_RESP)	Refer to section "FCVI(SEND_RESP)" on page 90.
FCVI(WRITE_RESP)	Refer to section "FCVI(WRITE_RESP)" on page 90.
FCVI(READ_RESP)	Refer to section "FCVI(READ_RESP)" on page 90.
FCVI(CONNECT_RQST)	Refer to section "FCVI(CONNECT_RQST)" on page 90.
FCVI(DISCONNECT_RQST)	Refer to section "FCVI(DISCONNECT_RQST)" on page 90.
FCVI(CONNECT_RESP1)	Refer to section "FCVI(CONNECT_RESP1)" on page 90.
FCVI(CONNECT_RESP2)	Refer to section "FCVI(CONNECT_RESP2)" on page 90.
FCVI(CONNECT_RESP3)	Refer to section "FCVI(CONNECT_RESP3)" on page 90.
FCVI (DISCONNECT_RESP)	Refer to section "FCVI(DISCONNECT_RESP)" on page 90.
FCAV	
FCAV(Simple)	Refer to section "FCAV(Simple)" on page 91.
FCAV(Extended)	Refer to section "FCAV(Extended)" on page 91.
ADVB	
ADVB(Object0)	Refer to section "ADVB(Object0)" on page 94.
ADVB(Objec2/3)	Refer to section "ADVB(Object2/3)" on page 101.
VSAN	
Basic	
VSAN-Basic Link Service	Refer to section "VSAN-Basic Link Service" on page 102.
VSAN-Link Control Frame	Refer to section "VSAN-Link Control Frame" on page 103.
FCP	
VSAN-FCP SCSI Command	Refer to section "Add VSAN-FCP SCSI Command" on page 104.
VSAN-FCP Frame Information Unit	Refer to section "Add VSAN-FCP Frame Information Unit" on page 105.

Event	Description
VSAN-SCSI Command Status	Refer to section “Add VSAN-SCSI Command Status” on page 106.
VSAN-FCP Task Management	Refer to section “Add VSAN FCP Task Management” on page 107.
ARB	
VSAN-ARB Loop Initialization	Refer to section “Add VSAN-ARB Loop Initialization” on page 109.
ELS	
VSAN-Extended Link Service-Request	Refer to section “VSAN-Extended Link Service - Request” on page 110.
VSAN-Extended Link Service-Request, Reply	Refer to section “VSAN-Extended Link Service - Request, Reply” on page 111.
VSAN-Extended Link Service-Reply	Refer to section “VSAN-Extended Link Service - Reply” on page 112.
GS	
VSAN-Generic Link Service-Request	Refer to section “VSAN-Generic Link Service - Request” on page 113.
VSAN-Generic Link Service-Request, Reply	Refer to section “VSAN-Generic Link Service - Request, Reply” on page 114.
VSAN-Generic Link Service-Reply	Refer to section “VSAN-Generic Link Service - Reply” on page 115.
SW	
VSAN-Switch Internal Link-Request	Refer to section “VSAN-Switch Internal Link Service - Request” on page 116.
VSAN-Switch Internal Link-Request, Reply	Refer to section “VSAN-Switch Internal Link Service - Request, Reply” on page 117.
VSAN-Switch Internal Link-Reply	Refer to section “VSAN-Switch Internal Link Service - Reply” on page 118.
FICON	
VSAN-FICON (Any Data Information Block Type)	Refer to section “VSAN-FICON (Any Data Information Block Type)” on page 119.
VSAN-FICON (Data)	Refer to section “Add VSAN-FICON Data” on page 120.
VSAN-FICON (Command)	Refer to section “Add VSAN-FICON Command” on page 121.
VSAN-FICON (Status)	Refer to section “Add VSAN-FICON Status” on page 123.
VSAN-FICON (Control)	Refer to section “Add VSAN-FICON Control” on page 126.
VSAN-FICON (Command-Data)	Refer to section “Add VSAN-FICON Command-Data” on page 128.
VSAN-FICON (Link-Control)	Refer to section “Add VSAN-FICON Link-Control” on page 130.
VSAN-FCAE-ASM	Refer to section “VSAN-FCAE-ASM” on page 132.
VSAN-FCAE 1553	
VSAN-FCAE 1553 (Any)	Refer to section “VSAN-FCAE-1553 Any” on page 133.

Event	Description
VSAN-FCAE 1553 (Data)	Refer to section "Add VSAN-FCAE-1553 Data" on page 134.
VSAN-FCAE 1553 (Command)	Refer to section "Add FCAE-1553 Command" on page 135.
VSAN-FCAE 1553 (Status)	Refer to section "Add VSAN-FCAE-1553 Status" on page 138.
VSAN FCAE-RDMA FCP SCSI Command - With Target Notification	Refer to section "VSAN FCAE-RDMA FCP SCSI Command - With Target Notification" on page 139.
VSAN RDMA FCP Command Frame Information Unit With Target Notification	Refer to section "VSAN FCAE RDMA FCP Command Frame Information Unit With Target Notification" on page 140.
VSAN FCAE-RDMA FCP SCSI Command - Without Target Notification	Refer to section "VSAN FCAE-RDMA FCP SCSI Command - Without Target Notification" on page 141.
VSAN RDMA FCP Frame Information Unit Without Target Notification	Refer to section "VSAN FCAE RDMA FCP Frame Information Unit Without Target Notification" on page 142.
FCVI	
VSAN-FCVI(Any)	Refer to section "VSAN-FCVI(Any)" on page 143.
VSAN-FCVI(SEND_RQST)	Refer to section "VSAN-FCVI(SEND_RQST)" on page 143.
VSAN-FCVI(WRITE_RQST)	Refer to section "VSAN-FCVI(WRITE_RQST)" on page 143.
VSAN-FCVI(READ_RQST)	Refer to section "VSAN-FCVI(READ_RQST)" on page 143.
VSAN-FCVI(SEND_RESP)	Refer to section "VSAN-FCVI(SEND_RESP)" on page 143.
VSAN-FCVI(WRITE_RESP)	Refer to section "VSAN-FCVI(WRITE_RESP)" on page 143.
VSAN-FCVI(READ_RESP)	Refer to section "VSAN-FCVI(READ_RESP)" on page 143.
VSAN-FCVI(CONNECT_RQST)	Refer to section "VSAN-FCVI(CONNECT_RQST)" on page 143.
VSAN-FCVI(DISCONNECT_RQST)	Refer to section "VSAN-FCVI(DISCONNECT_RQST)" on page 143.
VSAN-FCVI(CONNECT_RESP1)	Refer to section "VSAN-FCVI(CONNECT_RESP1)" on page 143.
VSAN-FCVI(CONNECT_RESP2)	Refer to section "VSAN-FCVI(CONNECT_RESP2)" on page 143.
VSAN-FCVI(CONNECT_RESP3)	Refer to section "VSAN-FCVI(CONNECT_RESP3)" on page 143.
VSAN-FCVI(DISCONNECT_RESP)	Refer to section "VSAN-FCVI(DISCONNECT_RESP)" on page 143.
FCAV	
VSAN-FCAV(Simple)	Refer to section "VSAN-FCAV(Simple)" on page 144.
VSAN-FCAV(Extended)	Refer to section "VSAN-FCAV(Extended)" on page 144.
ADVB	
ADVB(Object0)	Refer to section "ADVB(Object0)" on page 94.

Event	Description
ADVB(Objec2/3)	Refer to section “ADVB(Object2/3)” on page 101.
Custom Frame	Refer to section “Custom Frame” on page 147.
Protocol Errors	Refer to section “Protocol Errors” on page 149.

Settings in Advanced Mode

The following screen displays when you create a Scenario in Advanced Mode.

Note: To go to the Simple Mode click on the Switch to Simple Mode button. See “Settings in Simple Mode” on page 276.

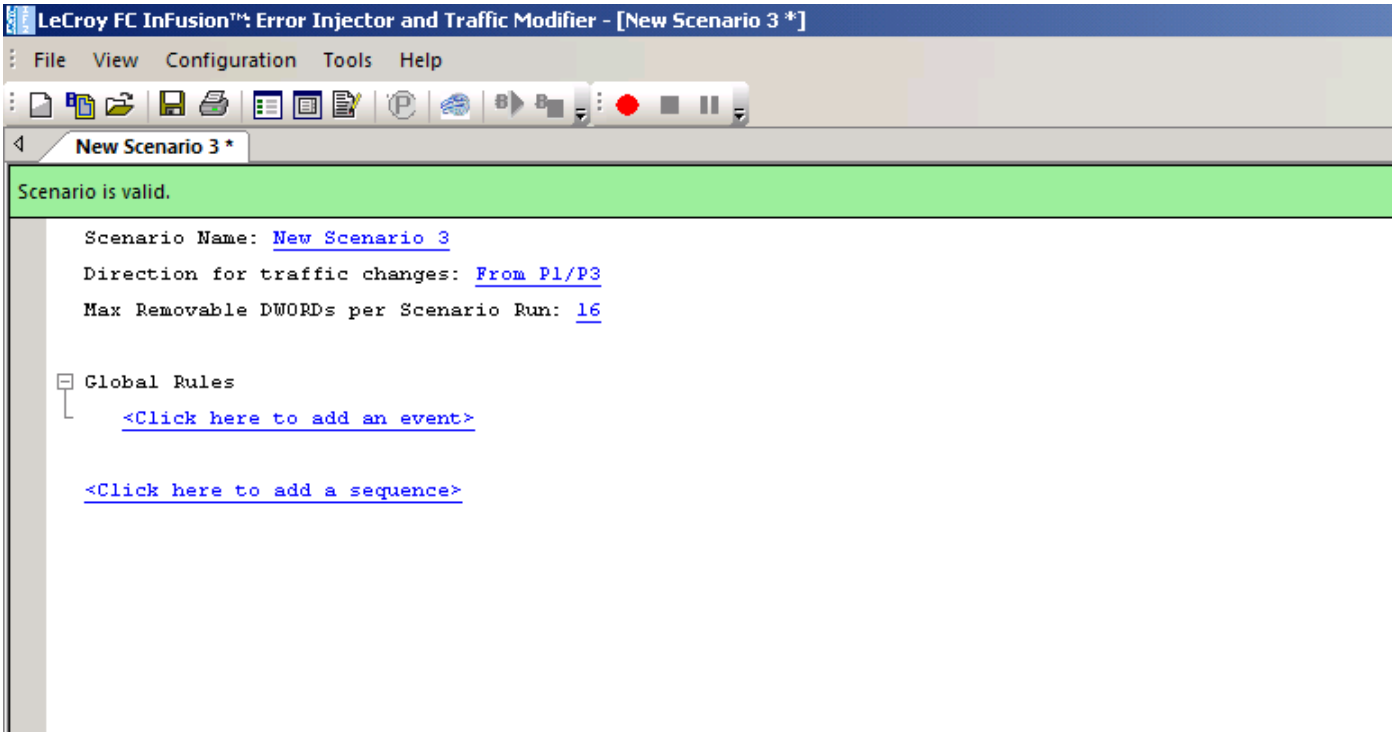


Figure 4.9: New Scenario in Advanced Mode in the FC InFusion Window

The following settings can be made to create a Scenario in Advanced Mode:

- **Scenario Name**: Give a name to the Scenario.
- **Direction for Traffic Changes**: Select **From P1/P3** or **From P2/P4.**
- **Max Removable DWORDs per Scenario Run**: This is used to tweak a trade-off between the maximum number of removable Dwords and the total delay through the FC InFusion. The more Dwords are allowed to be removed (up to 512 Dwords), the greater the total delay will be.
- **Global Rules**: Global Rules can be set by adding an Events, Combined Events, Actions and Sequences. Refer to “Global Rules” on page 300 for more information. To set the Events, Combined Event(s), Actions and/or Sequences:
  - Click on the link **<Click here to add an event>** to add an Event. The Events and their descriptions are listed in Table 4.2 on page 284.

- After the first Event has been specified you can set a Combined Event by clicking on the link **<Click here to add a combined event>.** The Events and their descriptions are listed in Table 4.2 on page 284.
- After specifying an Event/Combined Event(s), click on the link **<Click here to add an action>** to add an Action. The Actions and their descriptions are listed in Table 4.5 on page 294.

Note: You can specify Events, Combined Events and Actions and additional Events. The application automatically checks for the maximum number of terms (Events/Actions). When you exceed the limit, an error is flagged, prompting you to jump to the place that caused the error.

Sequence and States

- **Sequence:** Scenarios can contain Sequences. For detailed information on Sequences refer to "Sequences" on page 300.
  - Click on the link **<Click here to add a sequence>** to add a sequence. The State is displayed when you add a Sequence. Double-click on the **Sequence** to open the **Sequence Properties** dialog to name the sequence, if desired. Double-click on the **State** to open the **State Properties** dialog to name the state, if desired.

In a Sequence you can set Events, Combined Event(s), Actions, additional Sequences and States:

- Click on the link **<Click here to add an event>** to add an Event. The Events and their descriptions are listed in Table 4.2 on page 284.
- After the first Event has been specified you can set a Combined Event by clicking on the link **<Click here to add a combined event>.** The Events and their descriptions are listed in Table 4.2 on page 284.
- After specifying an Event/Combined Event(s), click on the link **<Click here to add an action>** to add an Action. The Actions and their descriptions are listed in Table 4.5 on page 294.

Note: You can specify additional Sequences and States. The application automatically checks for the maximum number of terms (sequences/states). When you exceed the limit, an error is flagged, prompting you to jump to the place that caused the error.

Table 4.2 describes the Presets that can be used as Events in the Advanced Mode.

TABLE 4.2: Advanced Mode Events and their Descriptions

Event	Description
User Patterns	
Most Recent	Lists the most recent Events.
New User Group	Lists the new user groups.
Presets	
Timers/External	
Timer	The Event occurs when the timer expires.
Other Trigs	Analyzer: the Event occurs when the Analyzer triggers. External: the Event occurs when the external Trigger In is asserted.
Basic	
Ordered Set	Refer to section "Ordered Set" on page 49.
Basic Link Service	Refer to section "Basic Link Service" on page 50.
Link Control Frame	Refer to section "Link Control Frame" on page 51.
Link Speed	The Event occurs when the link is at the specified speed.
Both Linkup	The Event occurs when both ports are out of electric idle.
Dword Matcher	Refer to section "Dword Matcher" on page 299.
Symbol 16G	
Training Sequence	**Inject Error on Control**: Generates Manchester Coding violation on Control field bits corresponding to the defined mask: One means violation, and zero means no error. **Inject Error on Status**: Generates Manchester Coding violation on Status field bits corresponding to the defined mask: One means violation, and zero means no error. **Frame Marker Error**: Generates training sequence with an invalid frame marker. **Recode Manchester Coding**: Forces jammer to recalculate Manchester Coding for each bit of training frame.
FCP	
FCP SCSI Command	Refer to section "FCP SCSI Command" on page 52.
FCP Frame Information Unit	Refer to section "FCP Frame Information Unit" on page 53.
SCSI Command Status	Refer to section "SCSI Command Status" on page 54.
FCP Task Management	Refer to section "FCP Task Management" on page 55.
ARB	
ARB Loop Initialization	Refer to section "ARB Loop Initialization" on page 56.
ELS	
Extended Link Service-Request	Refer to section "Extended Link Service - Request" on page 57.
Extended Link Service-Request, Reply	Refer to section "Extended Link Service - Request, Reply" on page 58.

Event	Description
Extended Link Service- Reply	Refer to section "Extended Link Service - Reply" on page 59.
GS	
Generic Link Service- Request	Refer to section "Generic Link Service - Request" on page 60.
Generic Link Service- Request, Reply	Refer to section "Generic Link Service - Request, Reply" on page 61.
Generic Link Service- Reply	Refer to section "Generic Link Service - Reply" on page 62.
SW	
Switch Internal Link - Request	Refer to section "Switch Internal Link Service - Request" on page 63.
Switch Internal Link - Request, Reply	Refer to section "Switch Internal Link Service - Request, Reply" on page 64.
Switch Internal Link - Reply	Refer to section "Switch Internal Link Service - Reply" on page 65.
FICON	
FICON (Any Data Information Block Type)	Refer to section "Any Data Information Block Type" on page 66.
FICON (Data)	Refer to section Refer to section "Add FICON Data" on page 67.
FICON (Command)	Refer to section Refer to section "Add FICON Command" on page 68.
FICON (Status)	Refer to section Refer to section "Add FICON Status" on page 70.
FICON (Control)	Refer to section Refer to section "Add FICON Control" on page 73.
FICON (Command-Data)	Refer to section "Add FICON Command-Data" on page 75.
FICON (Link-Control)	Refer to section "Add FICON Link-Control" on page 77.
FCAE 1553	
FCAE - ASM	Refer to section "FCAE-ASM" on page 79.
FCAE 1553 (Any)	Refer to section "FCAE-1553 Any" on page 80.
FCAE 1553 (Data)	Refer to section "Add FCAE-1553 Data" on page 81.
FCAE 1553 (Command)	Refer to section "Add FCAE-1553 Command" on page 82.
FCAE 1553 (Status)	Refer to section "Add FCAE-1553 Status" on page 85.
FCAE RDMA	
FCAE-RDMA FCP SCSI Command - With Target Notification	Refer to section "FCAE-FCP SCSI Command - RDMA With Target Notification" on page 86.
FCAE-RDMA FCP Command Frame Information Unit With Target Notification	Refer to section "FCAE RDMA FCP Command Frame Information Unit With Target Notification" on page 87.

Event	Description
FCAE-RDMA FCP SCSI Command - Without Target Notification	Refer to section "FCAE-RDMA FCP SCSI Command Without Target Notification" on page 88.
FCAE-RDMA FCP Command Frame Information Unit Without Target Notification	Refer to section "FCAE RDMA FCP Frame Information Unit Without Target Notification" on page 89.
FCVI	
FCVI(Any)	Refer to section "FCVI(Any)" on page 90.
FCVI(SEND_RQST)	Refer to section "FCVI(SEND_RQST)" on page 90.
FCVI(WRITE_RQST)	Refer to section "FCVI(WRITE_RQST)" on page 90.
FCVI(READ_RQST)	Refer to section "FCVI(READ_RQST)" on page 90.
FCVI(SEND_RESP)	Refer to section "FCVI(SEND_RESP)" on page 90.
FCVI(WRITE_RESP)	Refer to section "FCVI(WRITE_RESP)" on page 90.
FCVI(READ_RESP)	Refer to section "FCVI(READ_RESP)" on page 90.
FCVI(CONNECT_RQST)	Refer to section "FCVI(CONNECT_RQST)" on page 90.
FCVI(DISCONNECT_RQST)	Refer to section "FCVI(DISCONNECT_RQST)" on page 90.
FCVI(CONNECT_RESP1)	Refer to section "FCVI(CONNECT_RESP1)" on page 90.
FCVI(CONNECT_RESP2)	Refer to section "FCVI(CONNECT_RESP2)" on page 90.
FCVI(CONNECT_RESP3)	Refer to section "FCVI(CONNECT_RESP3)" on page 90.
FCVI (DISCONNECT_RESP)	Refer to section "FCVI(DISCONNECT_RESP)" on page 90.
FCAV	
FCAV(Simple)	Refer to section "FCAV(Simple)" on page 91.
FCAV(Extended)	Refer to section "FCAV(Extended)" on page 91.
ADVB	
ADVB(Object0)	Refer to section "ADVB(Object0)" on page 94.
ADVB(Objec2/3)	Refer to section "ADVB(Object2/3)" on page 101.
VSAN	
Basic	
VSAN-Basic Link Service	Refer to section "VSAN-Basic Link Service" on page 102.
VSAN-Link Control Frame	Refer to section "VSAN-Link Control Frame" on page 103.
FCP	
VSAN-FCP SCSI Command	Refer to section "Add VSAN-FCP SCSI Command" on page 104.
VSAN-FCP Frame Information Unit	Refer to section "Add VSAN-FCP Frame Information Unit" on page 105.
VSAN-SCSI Command Status	Refer to section "Add VSAN-SCSI Command Status" on page 106.
VSAN-FCP Task Management	Refer to section "Add VSAN FCP Task Management" on page 107.
ARB	
VSAN-ARB Loop Initialization	Refer to section "Add VSAN-ARB Loop Initialization" on page 109.

Event	Description
ELS	
VSAN-Extended Link Service-Request	Refer to section "VSAN-Extended Link Service - Request" on page 110.
VSAN-Extended Link Service-Request, Reply	Refer to section "VSAN-Extended Link Service - Request, Reply" on page 111.
VSAN-Extended Link Service-Reply	Refer to section "VSAN-Extended Link Service - Reply" on page 112.
GS	
VSAN-Generic Link Service-Request	Refer to section "VSAN-Generic Link Service - Request" on page 113.
VSAN-Generic Link Service-Request, Reply	Refer to section "VSAN-Generic Link Service - Request, Reply" on page 114.
VSAN-Generic Link Service-Reply	Refer to section "VSAN-Generic Link Service - Reply" on page 115.
SW	
VSAN-Switch Internal Link-Request	Refer to section "VSAN-Switch Internal Link Service - Request" on page 116.
VSAN-Switch Internal Link-Request, Reply	Refer to section "VSAN-Switch Internal Link Service - Request, Reply" on page 117.
VSAN-Switch Internal Link-Reply	Refer to section "VSAN-Switch Internal Link Service - Reply" on page 118.
FICON	
VSAN-FICON (Any Data Information Block Type)	Refer to section "VSAN-FICON (Any Data Information Block Type)" on page 119.
VSAN-FICON (Data)	Refer to section "Add VSAN-FICON Data" on page 120.
VSAN-FICON (Command)	Refer to section "Add VSAN-FICON Command" on page 121.
VSAN-FICON (Status)	Refer to section "Add VSAN-FICON Status" on page 123.
VSAN-FICON (Control)	Refer to section "Add VSAN-FICON Control" on page 126.
VSAN-FICON (Command-Data)	Refer to section "Add VSAN-FICON Command-Data" on page 128.
VSAN-FICON (Link-Control)	Refer to section "Add VSAN-FICON Link-Control" on page 130.
VSAN-FCAE-ASM	Refer to section "VSAN-FCAE-ASM" on page 132.
VSAN-FCAE 1553	
VSAN-FCAE 1553 (Any)	Refer to section "VSAN-FCAE-1553 Any" on page 133.
VSAN-FCAE 1553 (Data)	Refer to section "Add VSAN-FCAE-1553 Data" on page 134.
VSAN-FCAE 1553 (Command)	Refer to section "Add FCAE-1553 Command" on page 135.
VSAN-FCAE 1553 (Status)	Refer to section "Add VSAN-FCAE-1553 Status" on page 138.

Event	Description
VSAN FCAE-RDMA FCP SCSI Command - With Target Notification	Refer to section “VSAN FCAE-RDMA FCP SCSI Command - With Target Notification” on page 139.
VSAN RDMA FCP Command Frame Information Unit With Target Notification	Refer to section “VSAN FCAE RDMA FCP Command Frame Information Unit With Target Notification” on page 140.
VSAN FCAE-RDMA FCP SCSI Command - Without Target Notification	Refer to section “VSAN FCAE-RDMA FCP SCSI Command - Without Target Notification” on page 141.
VSAN RDMA FCP Frame Information Unit Without Target Notification	Refer to section “VSAN FCAE RDMA FCP Frame Information Unit Without Target Notification” on page 142.
FCVI	
VSAN-FCVI(Any)	Refer to section “VSAN-FCVI(Any)” on page 143.
VSAN-FCVI(SEND_RQST)	Refer to section “VSAN-FCVI(SEND_RQST)” on page 143.
VSAN-FCVI(WRITE_RQST)	Refer to section “VSAN-FCVI(WRITE_RQST)” on page 143.
VSAN-FCVI(READ_RQST)	Refer to section “VSAN-FCVI(READ_RQST)” on page 143.
VSAN-FCVI(SEND_RESP)	Refer to section “VSAN-FCVI(SEND_RESP)” on page 143.
VSAN-FCVI(WRITE_RESP)	Refer to section “VSAN-FCVI(WRITE_RESP)” on page 143.

As described later in this chapter, you can create any number of Scenarios and store them in libraries on the PC hard drive. Scenario library files names are in the following format:

`<filename>.ifc`

Creating FC InFusion Scenarios is easy, but it requires an understanding of the following terms defined in Table 4.3.

TABLE 4.3: Key Scenario Terms

Term	Definition
Action	FC InFusion response to an Event. See “Scenario Actions” on page 289.
Event	Condition that is detectable by FC InFusion. See “Scenario Events” on page 304.
Combined Event	Logical OR association of Events (for example, Event A OR Event B).
Global Rules	Portion of a Scenario that can define a single FC InFusion test state. You can think of the Global Rules and each sequence as a separate test routine or program operating within the Scenario. Each operates independently and in parallel with the others. The purpose of each is to detect Events and then respond with the appropriate Action or set of Actions. In essence, you can operate up to three test states simultaneously within FC InFusion - one is the Global Rules, and the other two are the 2 active states, one in each sequence. See “Global Rules” on page 300.

Term	Definition
Sequence	Portion of a Scenario that can define multiple FC InFusion test states. More flexible than the Global Rules, a sequence allows more powerful Scenarios that include branching and looping between test states (Global Rules can define only a single test state, so there is no branching). See “Sequences” on page 300.
State	“Behavior” of the Global Rules or a sequence at any point in time. In terms of FC InFusion testing, behavior is “waiting” for a set of Events and responding with a set of Actions.

Scenario Actions

After you enter the set of Events for a test state, the menu-driven interface prompts you for the corresponding Action or set of Actions. If you define multiple Actions, the Actions occur simultaneously.

Note: The Actions displayed are dependent on the Events selected.

The following figure displays the options for a set of Actions in the Simple Mode.

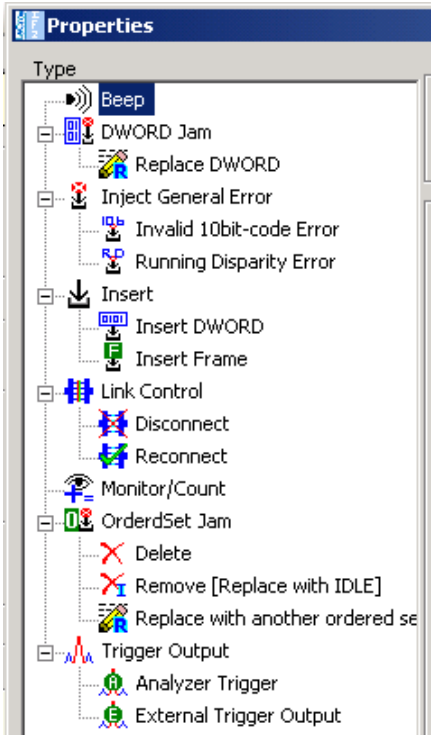


Figure 4.10: Action Properties Dialog box in Simple Mode

The following table lists supported Actions in Simple Mode. Note that some of these Actions only apply to creating sequences.

TABLE 4.4: Test State Actions in Simple Mode

Action		Description
Analyzer Trigger		The Jammer sends a trigger to the Analyzer.
Beep		Emits audible sound of duration selectable via a drop-down list.
Frame Jam	Insert DWORD Inside Frame	Allows to insert up to 14 dwords inside the frame, at the specified offset or at the “current” dword, meaning the dword that caused the Event.
	Modify [Keep Length]	Allows to manipulate each dword in the header, with the selected Action (click on Pass though to get a drop-down list).
	Remove [Replace with IDLE]	Removes the whole frame.
	Replace	Replaces the whole frame with the selected frame.
	Truncate	Removes some of the payload, as specified in the Frame Length.
Inject General Error	Invalid 10-bit-code Error	Injects invalid 10b code into the line.
	Running Disparity Error	Injects a Running Disparity (RD) error into traffic.
Insert	Insert DWORD	Allows to insert up to 14 dwords inside the frame, at the specified offset or at the “current” dword, meaning the dword that caused the Event.
	Insert Frame	Allows to insert a whole frame as specified from the list of available frames.
Link Control	Disconnect	Puts both FC InFusion FC ports at electrical idle immediately. This action is only in effect while the scenario is running, and the Jammer will reconnect the line when the scenario is stopped.
	Reconnect	Starts traffic pass-through immediately. This Action restarts traffic after a previous disconnect command. Once traffic is passing through, the originator and responder resume link bring up.

Action		Description
Monitor/Count		Opens a window to count the number of Events that occur during a session. A session is a time interval during which a Scenario runs.
Ordered Set Jam	Delete	Delete an Ordered Set Jam.
	Remove [Replace with IDLE]	Remove an Ordered Set Jam or Replace with another Ordered Set.
	Replace with another Ordered Set	Only replace with another Ordered Set.
Trigger Output		Sends a signal out the trigger port to the device downstream.
	Analyzer Trigger	The Action is to send a trigger to the Analyzer.
	External Trigger Output	The Action is to cause an external trigger output.

The following figure displays the options for a set of Actions in the Advanced Mode.

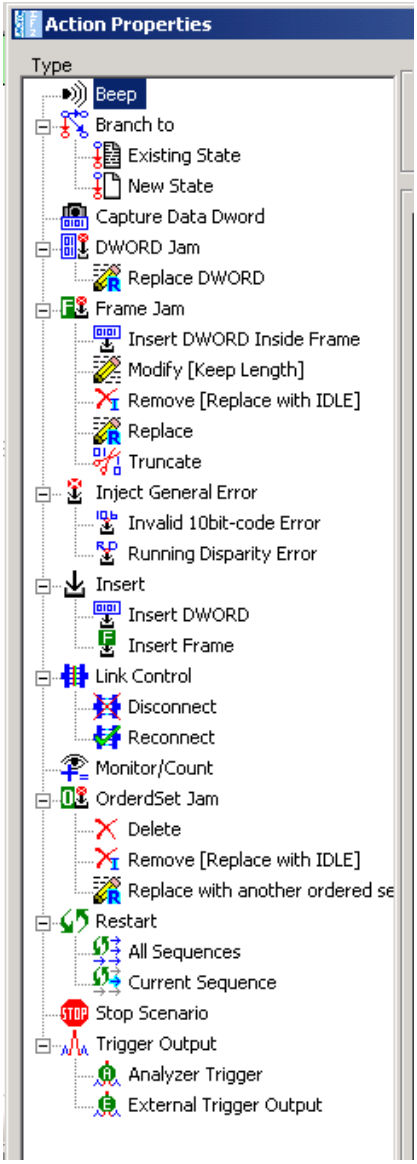


Figure 4.11: Action Properties Dialog box in Advanced Mode

The following table lists supported Actions in Advanced Mode. Note that some of these Actions only apply to creating sequences.

TABLE 4.5: Test State Actions in Advanced Mode

Action		Description
Analyzer Trigger		The Jammer sends a trigger to the Analyzer.
Beep		Emits audible sound of duration selectable via drop-down list.
Branch to	Existing State[1]	Go to a state in this sequence that is already defined.[1]
	New State[1]	Go to a state in this sequence that is not yet defined (you need to define it).[1]
Capture Data Dword		Captures a data dword into one of four registers.
DWORD Jam		
	Replace	Replace DWORD
Frame Jam	Insert DWORD Inside Frame	Allows to insert up to 14 dwords inside the frame, at the specified offset or at the “current” dword, meaning the dword that caused the Event.
	Modify [Keep Length]	Allows to manipulate each dword in the header, with the selected Action (click on Pass though to get a drop-down list).
	Remove [Replace with IDLE]	Removes the whole frame.
	Replace	Replaces the whole frame with the selected frame.
	Truncate	Removes some of the payload, as specified in the Frame Length.
Inject General Error	Invalid 10-bit-code Error	Injects invalid 10b code into the line.
	Running Disparity Error	Injects a Running Disparity (RD) error into traffic.
Insert	Insert DWORD	Allows to insert up to 14 dwords inside the frame, at the specified offset or at the “current” dword, meaning the dword that caused the Event.
	Insert Frame	Allows to insert a whole frame as specified from the list of available frames.

Action		Description
Link Control	Disconnect	Puts both FC InFusion FC ports at electrical idle immediately. This action is only in effect while the scenario is running, and the Jammer will reconnect the line when the scenario is stopped.
	Reconnect	Starts traffic pass-through immediately. This Action restarts traffic after a previous disconnect command. Once traffic is passing through, the originator and responder resume link bring up.
Monitor/Count		Opens a window to count the number of Events that occur during a session. A session is a time interval during which a Scenario runs.
Ordered Set Jam	Delete	Delete an Ordered Set Jam.
	Remove [Replace with IDLE]	Remove an Ordered Set Jam or Replace with another Ordered Set.
	Replace with another Ordered Set	Only replace with another Ordered Set.
Restart	All Sequences[1]	Restart all sequences in the Scenario.[1]
	Current Sequence[1]	Restart the sequence that contains this Action definition. [1]
Stop Scenario		Stops all Scenario activity.
Trigger Output		Sends a signal out the trigger port to the device downstream.
	Analyzer Trigger	The Event occurs when the Analyzer triggers.
	External Trigger Output	The Event occurs when the external Trigger In is asserted.

[1] Only shown in Action Properties dialog box when creating a sequence.

Available Resources

The list of available resources for Fibre Channel is given below:

- Symbol Detector (each has its own Embedded counter) X 4
- Ordered-set Detector (each has its own Embedded counter) X 8
- Pattern (32bit) Detector (each has its own Embedded counter) X 12
- Training Sequence Detector X 4
- Counter X 12
- Frame Detector X 8

- Timer X 8
- Frame Jammer X 8
- Symbol Substitute X 4
- Pattern/Orderded-set Substitute X 12 (shared with Pattern detectors)
- Training Sequence Jammer X 4
- Capture DWORD slot X 8
- Insert frame slot (up to 4K bytes) X 1
- Insert DWORD inside frame (up to 64 bytes) X 8
- Global Action Register X 8
- State per sequencer X 256
- Action Register per state X 8

Usage of Action Register:

- Each Counter in Global Rules = 2
- Each Counter in State = 3
- Each Timer in Global Rules = 2
- Each Timer in State = 3
- Other Actions = 1

Using Counters in Events and Actions

Many of the Events and Actions supported by FC InFusion also support counters that can control functions.

Within Events, counters determine how many times the Event must occur before the associated Actions are triggered. Event counters typically have two properties:

- **Count Randomly**: Can be set to “Yes” or “No” (default value is “No”).
  If set to “Yes”, the Event repeats a random number of times (between 1 and the value set in the property **Max Random Count**, which replaces the property **Counter Value** when “Yes” is selected), before the Action is triggered.
- **Counter Value**: Number of repeats required when **Count Randomly** is set to “No”. The default value is 1.

Within Actions, counters determine how many times the Event happens before it executes the Action. Note that an Event can be defined for a number of occurrences, so in total, the Event will have to occur for Event counter multiplied by the Action counter times before the Action gets executed. For example, if the Event is defined with a counter of 5, and Action with a counter of 10 such Events, the Event looked at will have to occur 50 times before the Action is taken.

Action counters typically have two properties:

- **Random**: Can be set to “Yes” or “No” (default value is “No”).
  If set to “Yes”, the Action triggers a number of occurrences before the Action takes place. That number ranges randomly between 1 and the value set in the property **At least every Nth occurrence**, which replaces the property **Every Nth occurrence** when “Yes” is selected.
- **Every Nth occurrence**: Number of times the system calls the Action before it acts.

Note that there is some overlap in the way these counters can be used. For example, in the simple case of a single Event leading to a single Action, it makes no difference whether you specify the Event to require five repeats before triggering the Action, or the Action to require five occurrences before it acts.

However, in the case of combined Events and/or Actions, the separate counters provide flexibility in designing test cases. For example, consider the case where Event_1 OR Event_2 leads to Action. If Event_1 has a counter of 5, then the Action triggers either when Event_1 has repeated five times or when Event_2 happens the first time, whichever occurs first.

But if the Event counters are set to 1 and the Action counter is set to 5, then the Action happens after five occurrences of EITHER Event_1 or Event_2.

Capturing a Data Dword

FC InFusion provides the ability to capture individual data dwords and provides different registers to store captured dwords. When your detector is DWord Matcher you can use Dword #0, #1, #2 and #3 and when your detector is Pattern Detector you can use Dword #4, #5, #6 and #7. When trying to use the captured dword, for example in Replace Dword Action, you can actually select from 8 captured dwords, numbered 0 through 7.

To capture a data dword, select **Capture Data Dword** from the Action Properties screen (in Advanced Mode), as shown below. Select the location you would like the captured Dword to be stored in, so it can be used in a later replacement or insertion.

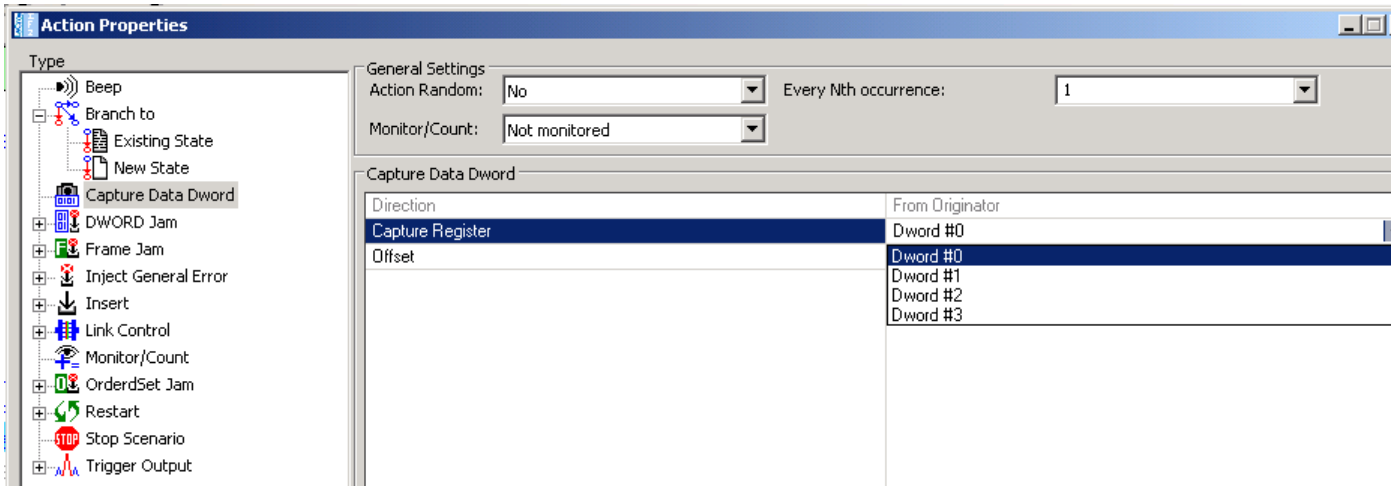


Figure 4.12: Capture Data Dword Action

Using Captured Data Dwords

Captured data dwords can be used in creating Events for data that match the captured dword(s), or in creating Actions to substitute tor insert the captured dword(s) into the data stream.

To create an Event using the captured dword, in the Add Event dialog, select Dword Matcher and change the Type to the desired Captured Dword number. Note that choice of a mask and an offset are still available. Select the code mask from the drop-down menu.

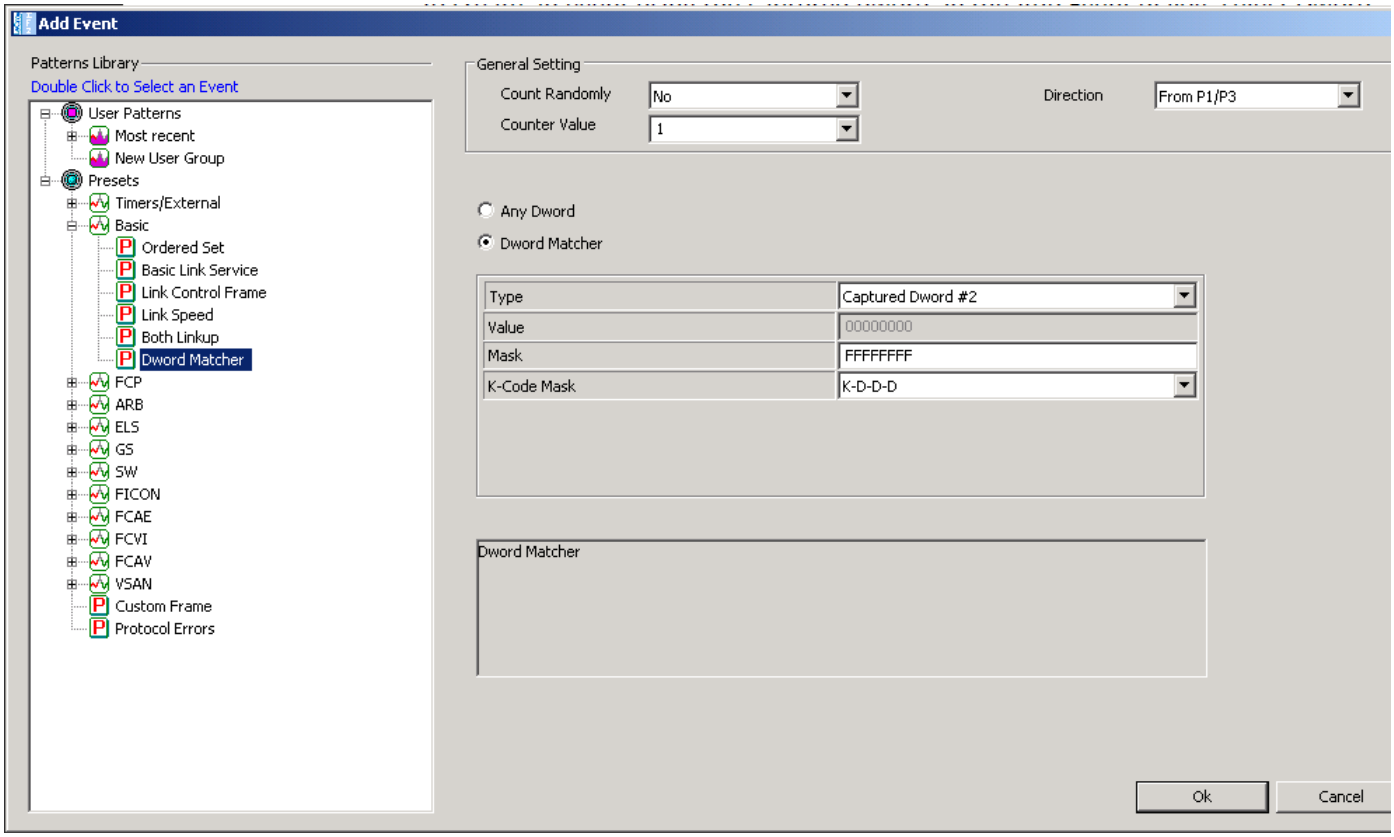


Figure 4.13: Using Captured Dword as an Event

Captured data dwords may also be used in the **Substitute Data Dword** Action. From the Action Properties screen, click on the **DWORD Jam** icon and click on Replace DWORD, choose **Substitute For Custom Dword** and then select the **Substitute for** property. A drop-down menu is provided (see below) that allows the choice of a custom dword or any of the four captured dword registers.

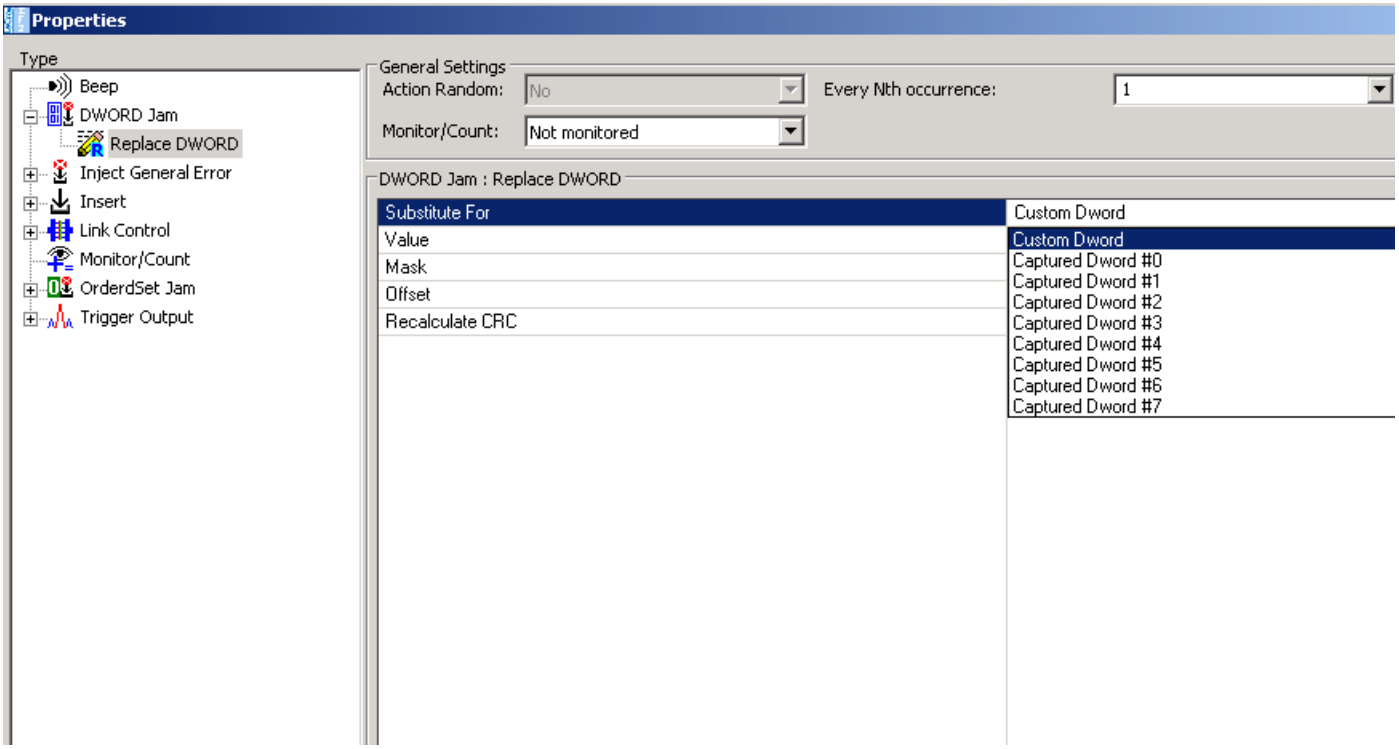


Figure 4.14: Using a Captured Data Dword in Substitute Dword Test Action

Dword Matcher

Dword Matcher is a dword pattern matcher that presents match and mask fields and a K-Code Mask field. K-Codes are control characters that are always used in the first byte of a four-byte ordered-set. Of the K-Code masks listed in the menu, D-D-D-D is used for data bytes, and K-D-D-D is used for all ordered-sets.

When you create a dword match, keep the following in mind:

- The pattern can be inside or outside of frames (it does not matter if the pattern is inside a frame or not).
- Because the pattern can be inside or outside of frames, there is no offset.
- You can make user-defined ordered-sets. (This is the reason this feature was created.)
- You can use any K/D pattern.

Global Rules

Global Rules are a portion of the Scenario that can define only one test state. To create the Global Rules, you use the menu-driven interface to enter an Event or Combined Event and the corresponding Action or set of Actions (the response of FC InFusion hardware to the Event).

In the case of a Combined Event, the Action is taken upon occurrence of any of the Events stated for the Event combination. It is a logical OR association, meaning any of the Events can trigger the Action.

After you enter the Event or Combined Event, the interface prompts you for Actions. An Action might be, for example, injecting a particular ordered-set or error into the traffic stream. You can enter multiple Actions, which take place simultaneously. If one of the Actions is Stop Scenario, the other Actions will NOT be carried out. To stop the Scenario after the requested Actions have been carried out, you should branch to a new state which stops the Scenario.

After defining the Event and Actions within the Global Rule area, you can save the Scenario and run it.

Sequences

The Global Rules are all you need for simple test Scenarios. However, a Scenario also can contain one or two sequences, which can define multiple states and allow branching between states. With a sequence, you also can do looping, which allows you to repeat a test state or to execute a test for a specified period of time.

As with Global Rules, the menu-driven interface guides you in building a sequence. Some of the prompts are different, however, because you now are encapsulating groups of Events and Actions as distinct states. Recall that a state is a combination of Events and Actions at a specific point in time. If the Event or Combined Event defined by a state occurs, the corresponding Action or set of Actions follows.

Figure 4.15: Global Rules and Sequence Areas of a Scenario

FC InFusion hardware provides the capacity to have up to two sequences co-existing in a Scenario in addition to the Global Rules. Recall that both the Global Rules and any sequences are active at all times. Each is a separate “state machine,” having the behavior of a particular test state at any point in time. Because the Global Rules has the capacity for only one state, you can view it as a “degenerative state machine.”

Scenario Libraries

You can create any number of Scenarios, which you then can archive on your PC hard drive. Libraries are windows that hold Scenarios.

Note: Each library is a separate ***.ifc** file.

Main Library

When you launch the FC InFusion application, it opens a window called the Main Library. The main library is the default workspace for creating and storing new Scenarios. The main library corresponds with the following file in the FC InFusion folder on the PC hard drive:

```
DEFAULT.IFC
```

File Libraries

You can save the main library with a name other than default (while still using the **.ifc** file extension). The new file becomes a file library that is functionally equivalent to the main library with the following exception: It does not open by default in the Main Library window. You can open other file libraries using the File Open menu option of the FC InFusion application.

In this manual, the main library and other **.ifc** file libraries are collectively called general libraries.

If you select **Open,** you see a window similar to the following:

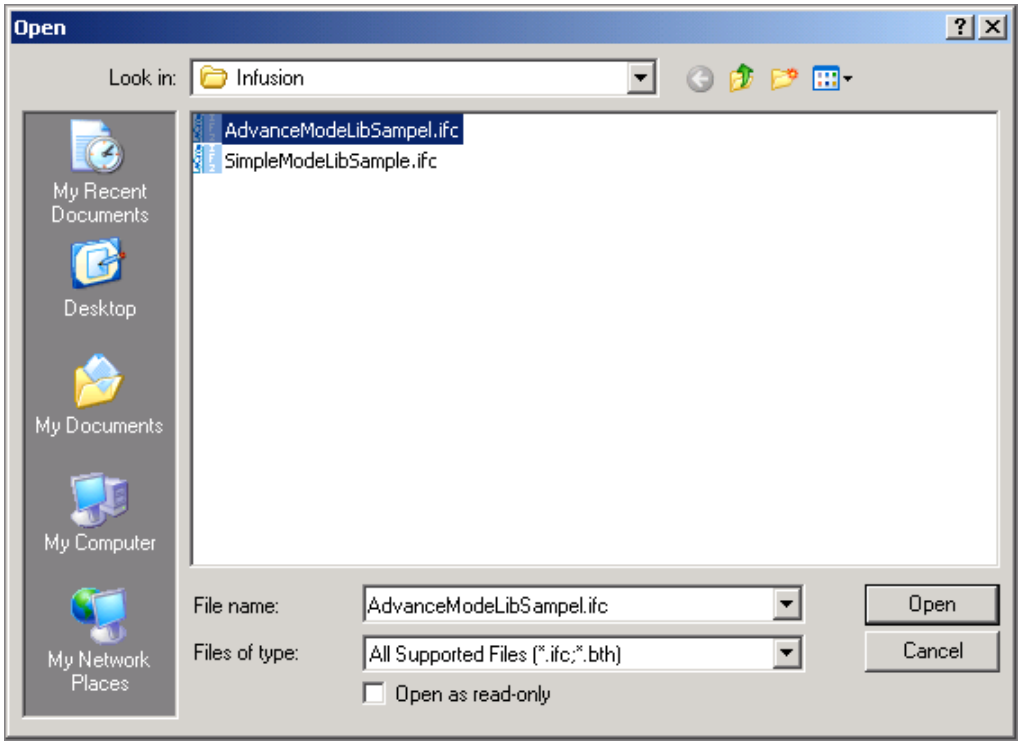


Figure 4.16: Open File List

Scenario Properties

To begin the Scenario creation process, you click the **New Scenario** button in a library window or on the FC InFusion application toolbar. As the first step in creating a Scenario, the application prompts you for Scenario name, a short description (optional), and the direction of traffic to which any traffic changes apply. Changes are, for example, injection or removal of data or an ordered-set.

You identify direction of traffic change, or modification, in terms of traffic origin. The application uses the following conventions:

- **From P1/P3**: Change is made to traffic coming from Port 1 or Port 3 (for example, CRC error is injected into traffic stream sent from P1/P3 to P2/P4).
- **From P2/P4**: Modification is made to traffic coming from the Port 2 or Port 4 (for example, CRC error is injected into traffic stream sent from P2/P4 to P1/P3).

Figure 4.17 on page 303 shows the first prompt in the Scenario creation process.

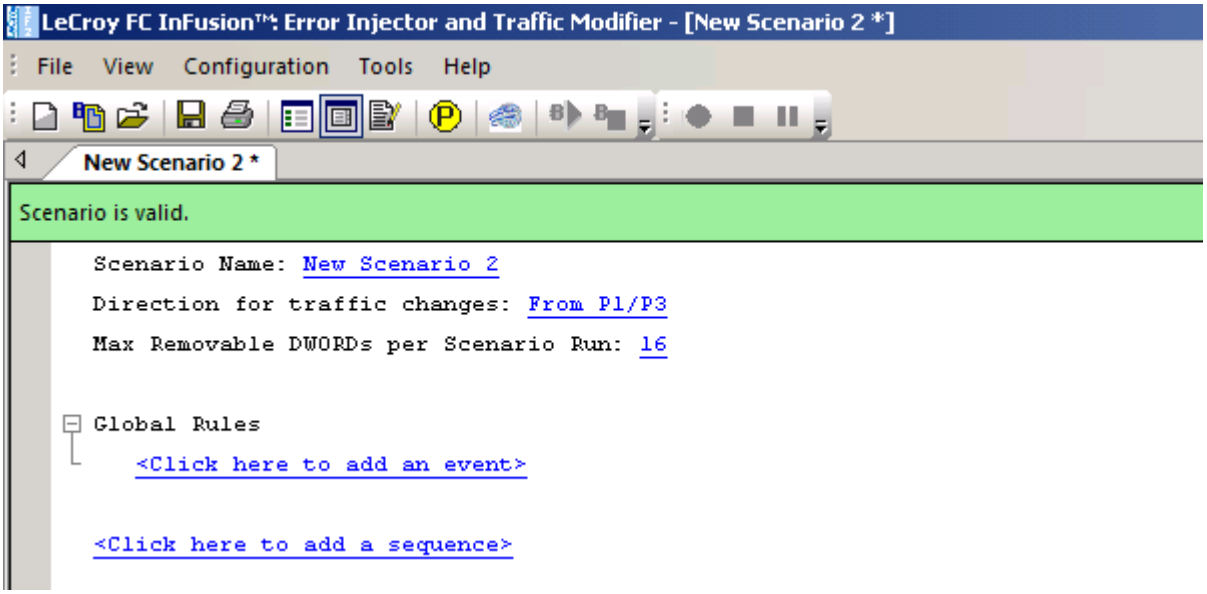


Figure 4.17: Entering Basic Scenario Information

To copy an Event or Action, right-click on the Event or Action and select **Copy**. Right-click **Click here to add another event** or **Click here to add an action** and then select **Paste**.

To copy a sequence or state, right-click on the sequence or state and select **Copy**. Right-click **Click here to add another sequence** or **Click here to add another state** and then select **Paste**.

You can also cut, delete, and edit a selected Sequence, State, Event, or Action.

When you click the Scenario Name or the Direction For Traffic Changes, the Scenario Properties dialog box displays (see Figure 4.18 on page 304), allowing you to enter the Scenario name, a short description, and direction of traffic change.

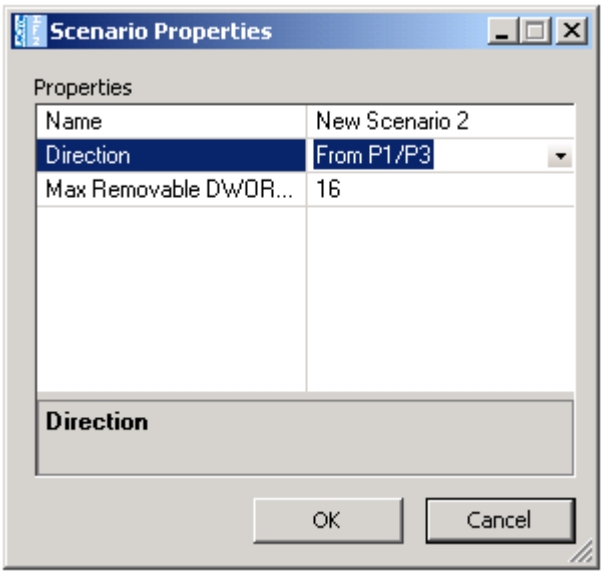


Figure 4.18: Scenario Properties Dialog Box in Advanced Mode

In the Scenario Properties screen, the direction for traffic modification is defined on a global basis for the entire Scenario. In other words, any Scenario Action that modifies line traffic only affects the traffic flowing in the direction established at the top of the Scenario, in the Scenario Properties. Scenario Events can be monitored in either direction, and therefore the parameters for Events provide the ability to specify the intended direction for monitoring traffic for that Event.

Scenario Events

A Scenario is a script you create using simple mouse clicks and text entries. As you work, the script takes shape in the Scenario area of the application display. You can think of the Scenario area itself as consisting of two subareas: A Global Rules area at the top, where you create the Global Rules, and a Sequence area beneath the Global Rules, where you create any sequences. Whether you are creating Arm Events, Jam Events or Jam Actions (in Simple Mode), or Global Rules or a Sequence (in Advanced Mode), the menu-driven interface prompts you to specify the Event(s) for which you want to trigger Actions.

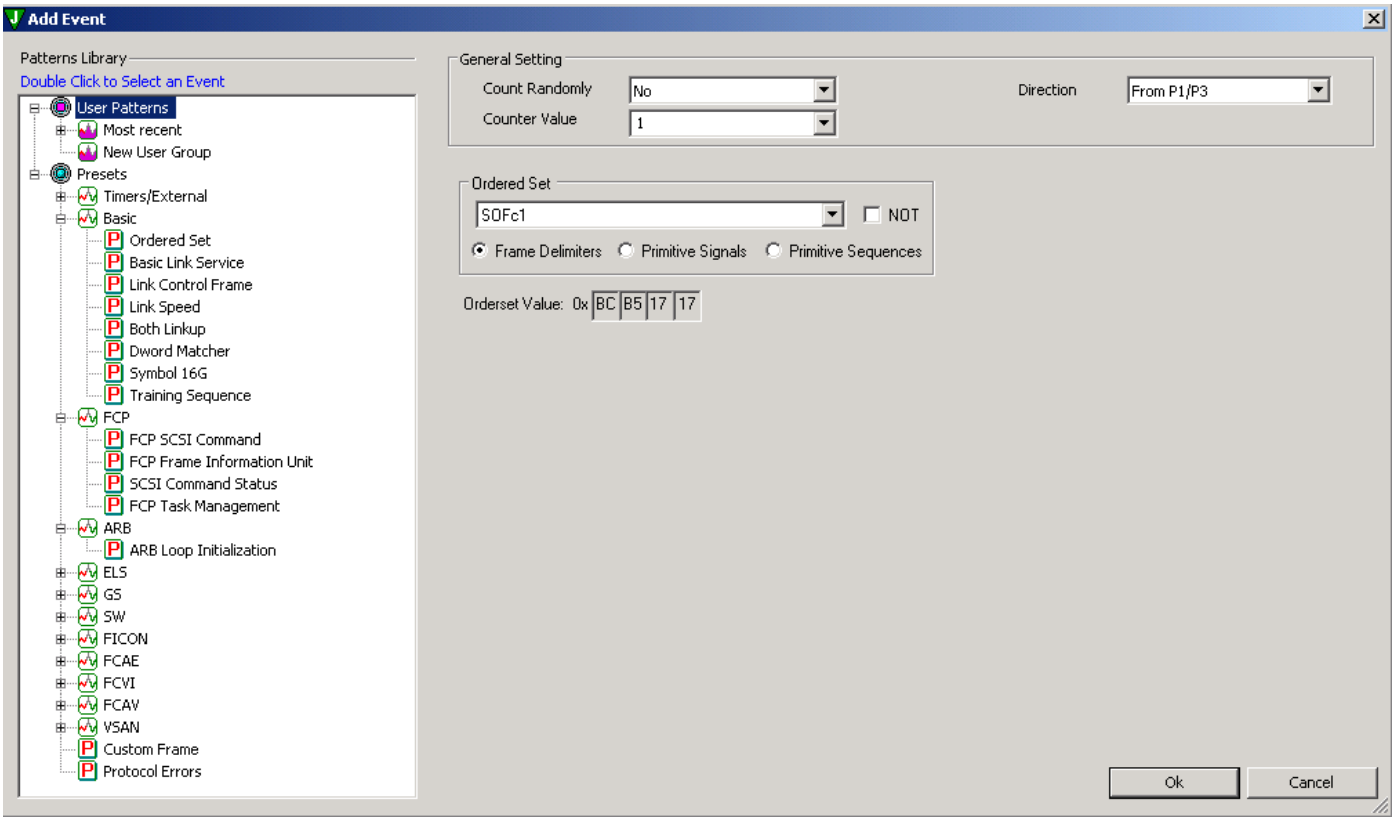


Figure 4.19: Event Properties Dialog

While many Events are line conditions, an Event also can be a condition that occurs within a FC InFusion device (for example, detection of a trigger signal from another device).

Table 4.1 on page 277 and Table 4.2 on page 284 lists supported Events in Simple Mode and Advanced Mode respectively. Note that some Events are applicable only in the context of creating sequences, in Advanced Mode (those Events appear on the drop-down list only if you are creating a sequence). Sequences can have multiple states, and they allow branching between states.

Scenario Examples

A few examples are described, one in Simple Mode and one in the Advanced Mode.

Example 1 in Simple Mode

In this example, the Arm Event is an Extended Link Service Request with ELS Command: RRQ (0x12) (From Originator), the Arm Rollback In is set after a specific duration of 10 seconds. In Jam Details the Jam Event is set for an ARB Loop Initialization and the Jam Action is to insert a frame and beep.

Perform the following steps to create this Scenario:

1. Select **New Scenario** from the **File** menu or click the **New Scenario** icon in the toolbar of the main window or the File Library.

Settings

2. Enter the **Scenario Name** in the field provided in Settings. In this example the Scenario Name is Simple Example 1.
3. Select the **Jam Direction** from the drop-down menu to choose the direction of traffic to monitor the selected Event (the default is **From P1/P3)**, which is selected for this example).
4. Select **Repeat Jam** value from the drop-down menu. In this case once is selected.

Arm Detail

5. Select the **Arm Exists** checkbox to add an Arm Event.
6. In this example the Arm Event is an Extended Link Service Request with ELS Command: RRQ (0x12) (From P1/P3). You can select the Arm Rollback In from the drop-down list. In this case the Arm Rollback In is After Specific Duration of 10 seconds.

Jam Details

7. Specify the Jam Event to be performed. In this example the Jam Event is an ARB Loop Initialization; Loop Init ID: Any [0x11XXXXX] [From P1/P3].

Jam Action

8. The Jam Action specified is to Insert Frame [SOF : SOFc1 CRC : Auto Calculate CRC |EOF : EOFt]; followed by a Beep for a duration of 50 ms.

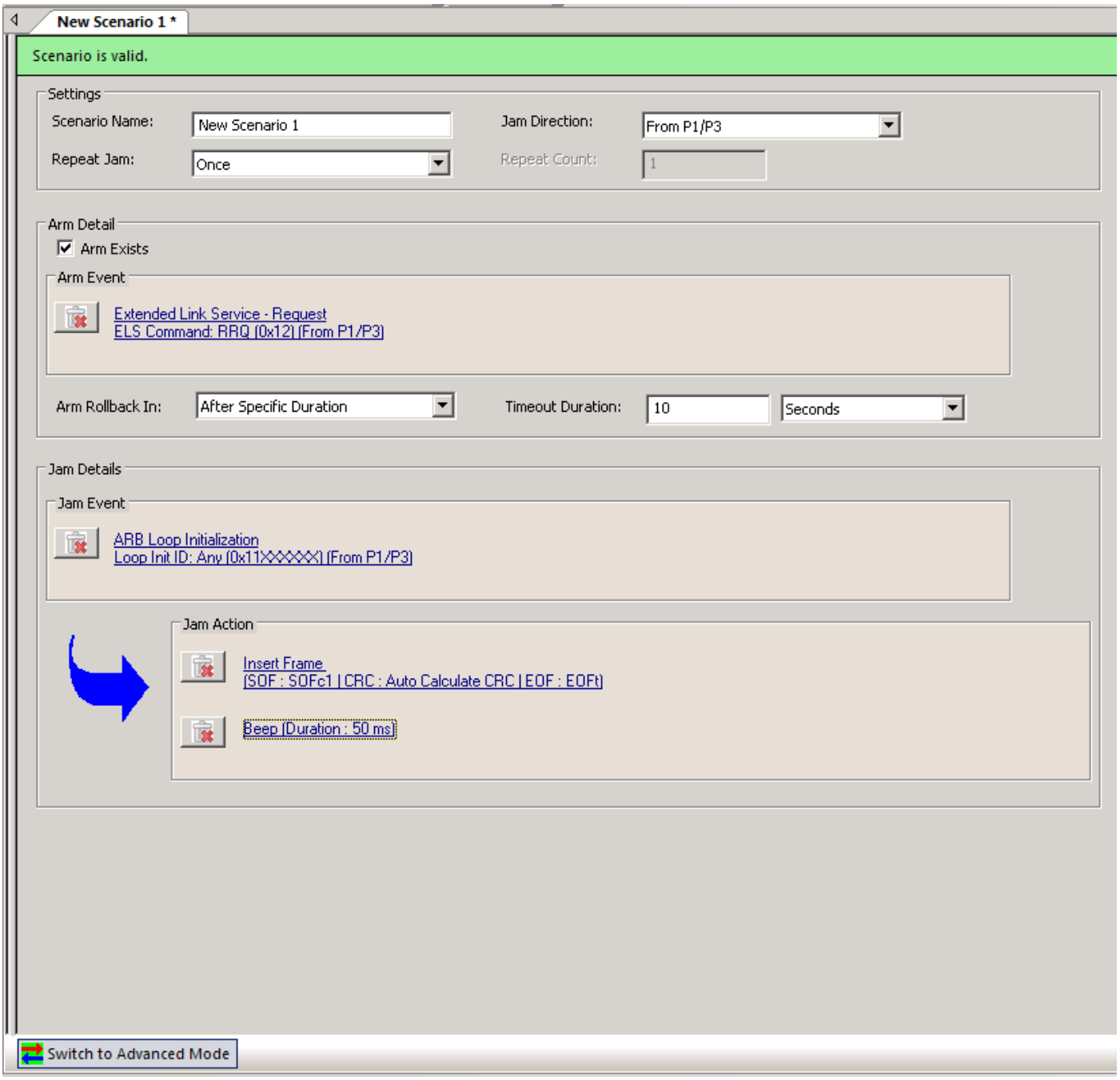


Figure 4.20: Simple Example 1

Example 2: Insert DWORD in Advanced Mode

In this example, the Global Rules area of the Scenario waits for a Custom Frame then inserts a Dword inside the frame. In Sequence 0 and State 0 it waits for an FCP SCSI Command, SBC3; inserts a Dword inside the frame, beeps for a duration of 50 ms and stops the Scenario.

Creating Global Rules

This section describes using the Global Rules area of the Scenario for this example. Recall that the Global Rules area defines a single test state. The Global Rules do not have the capacity for multiple states, so that area of a Scenario cannot change state.

In terms of FC InFusion testing, a state defines test "behavior." In this context, behavior is "waiting" for an Event and responding with an Action or set of Actions that happen simultaneously.

Keep in mind that a test state you implement with the Global Rules operates in parallel with the active test state of each sequence in the Scenario.

In effect, FC InFusion lets you do up to three line tests at the same time. You can do one test with the Global Rules and a separate test with each sequence you create. You can have up to two sequences in a Scenario.

Perform the following steps to create this Scenario:

1. Select **New Scenario** from the **File** menu or click the **New Scenario** icon in the toolbar of the main window or the File Library.
2. Click on the Scenario Name link and enter the Scenario Name: Insert, Direction of traffic change and Max. Removable DWORDs in the Scenario Properties dialog. Click **OK**.
3. Click **Direction for Traffic Changes** to choose the direction of traffic to monitor the selected Event (the default is **From P1/P3**, which is selected for this example).
4. In the Global Rules area, click the link **<Click here to add an event>,** see the following figure.

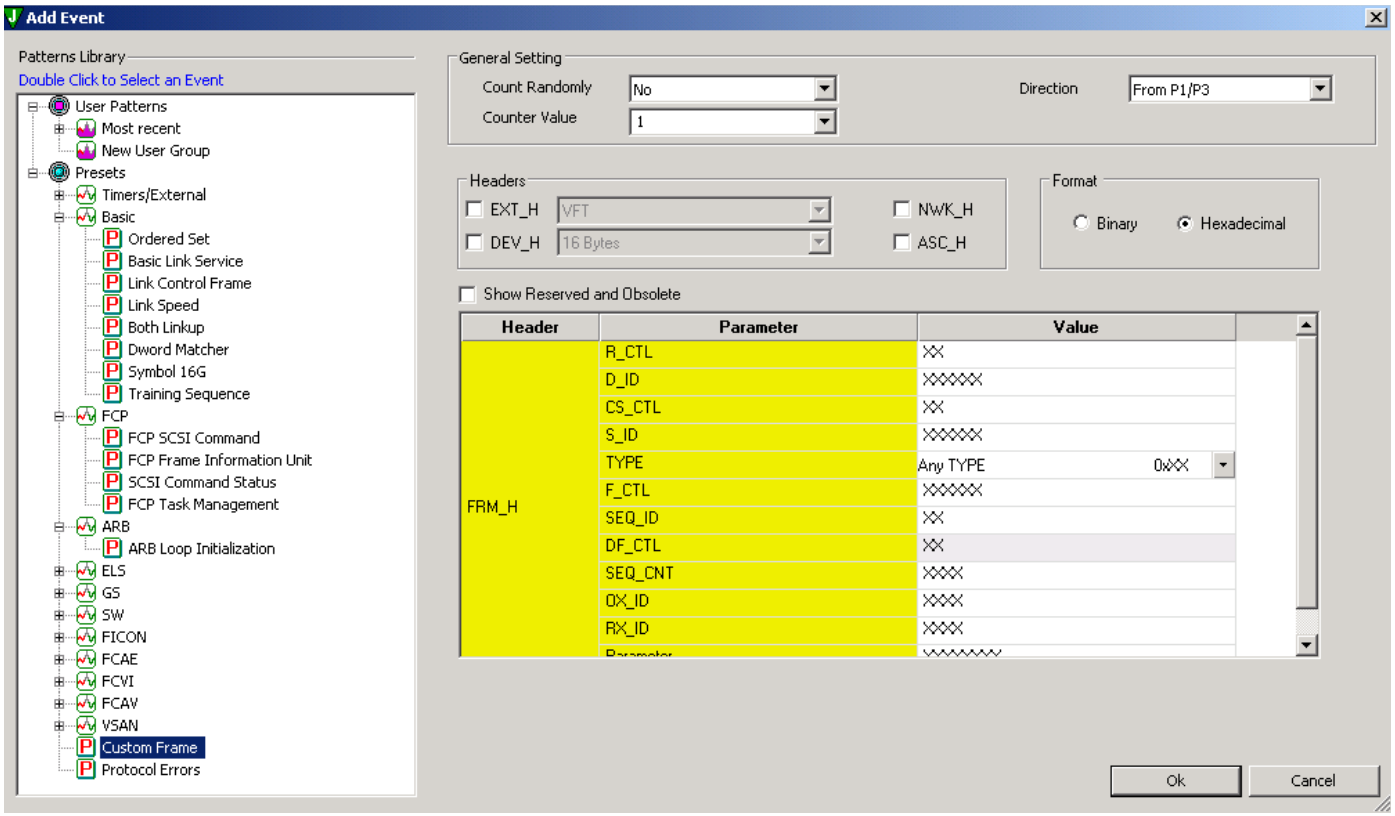


Figure 4.21: Example 2: Adding an Event

5. The Add Event dialog box opens. Double-click on **Custom Frame** in the Patterns Library pane. Enter values for R_CTL and D_ID.
6. Click **OK** to close the Add Event dialog box.
7. In the Global Rules area, click the link to **<Click here to add an action>.**

Figure 4.22: Example 2: Adding an Action

The Action Properties dialog box appears (see Figure 4.11 on page 293).

8. In the Type column on the left, choose the Action that you want to occur. In this example the Action is **Insert DWORD Inside Frame**.
9. Click **OK** to close the Action Properties dialog box

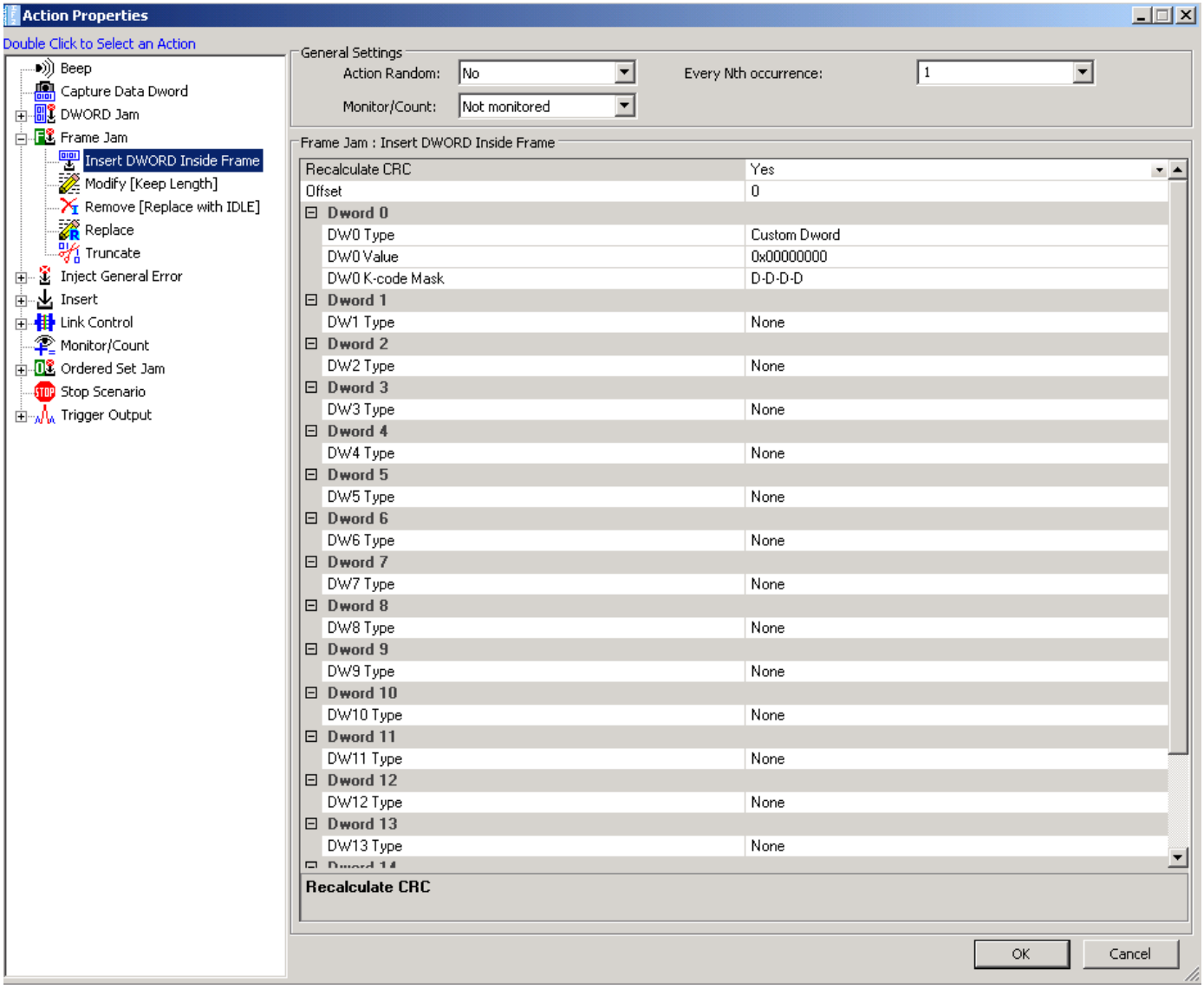


Figure 4.23: Example 2: Inserting DWORD Inside Frame

10. In the File menu, select **Save Scenario** to save the Scenario.

Adding a Sequence

11. To add a Sequence click on the link **<Click here to add a sequence>**.

    Prompts for the sequence appear beneath the Global Rules area. You create a sequence one state at a time. The application numbers states consecutively from 0 up (1, 2, 3, and so on).

Figure 4.24: Example 2: Adding a Sequence

By default, the name of the first sequence in a Scenario is Sequence 0. The name of the first state is State 0. To change the name of a sequence or state, or to associate a description with it, click the name of the sequence or state. The Sequence or State Properties dialog box appears that allows you to enter that information.

12. In the State 0 area, click the link **<Click here to add an event>.**

Figure 4.25: Example 2: Adding an Event for State 0

The Event Properties dialog box appears.

13. In the Event Properties dialog box, select **FCP SCSI Command** under **FCP** as the Event. Select the **SBC-3** radio button and select **Read (10) 0x28** from the Command Type drop-down menu.

14. Click **OK** to close the Event Properties dialog box, see the following screen capture.

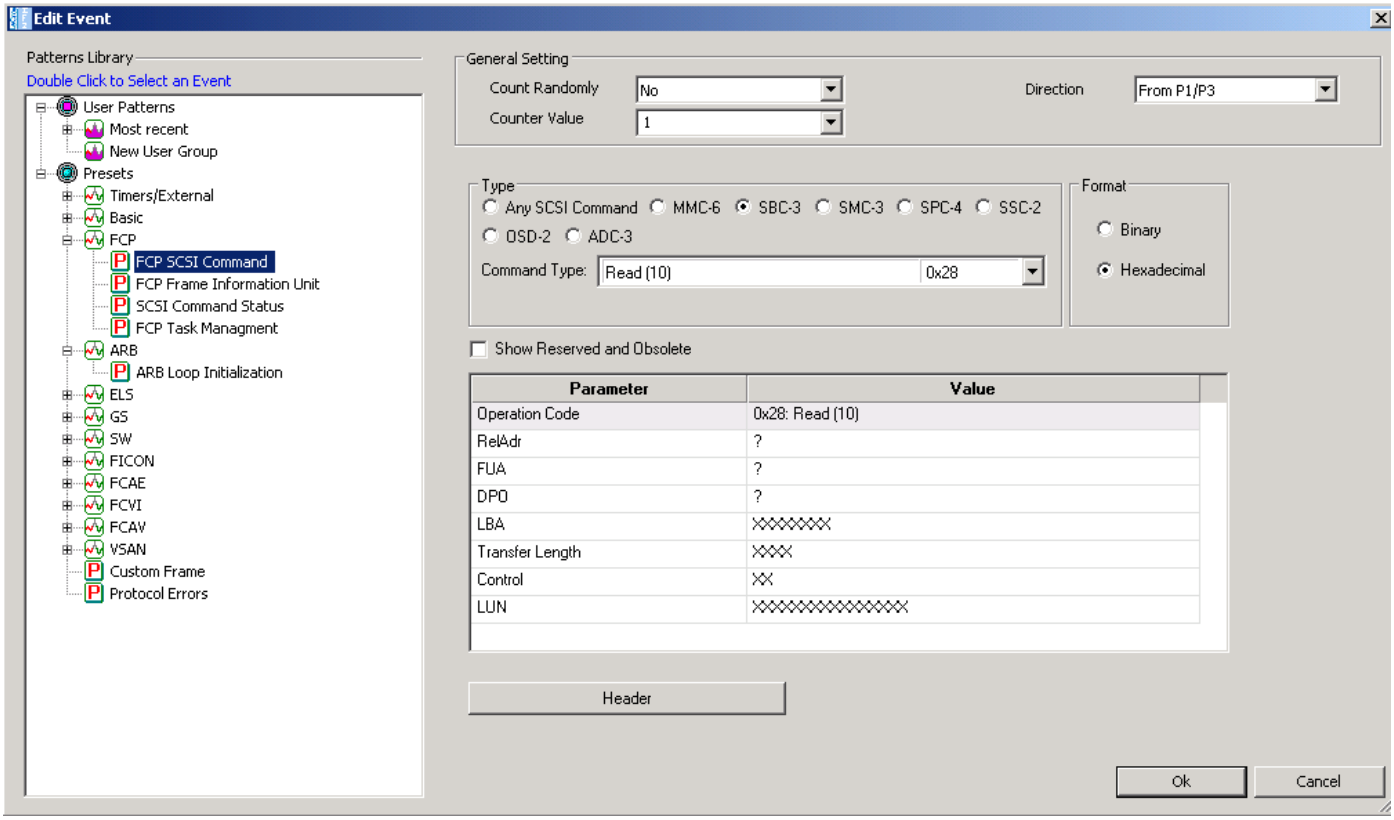


Figure 4.26: Example 2: Adding an Event for State 0

15. After adding an Event, to add an Action in the State 0 area, click the link **<Click here to add an action>**.

Figure 4.27: Example 2: Adding an Action for State 0

The **Action Properties** dialog box appears.

16. For the Action, select **Frame Jam> Insert DWORD Inside Frame, Recalculate CRC: No**.

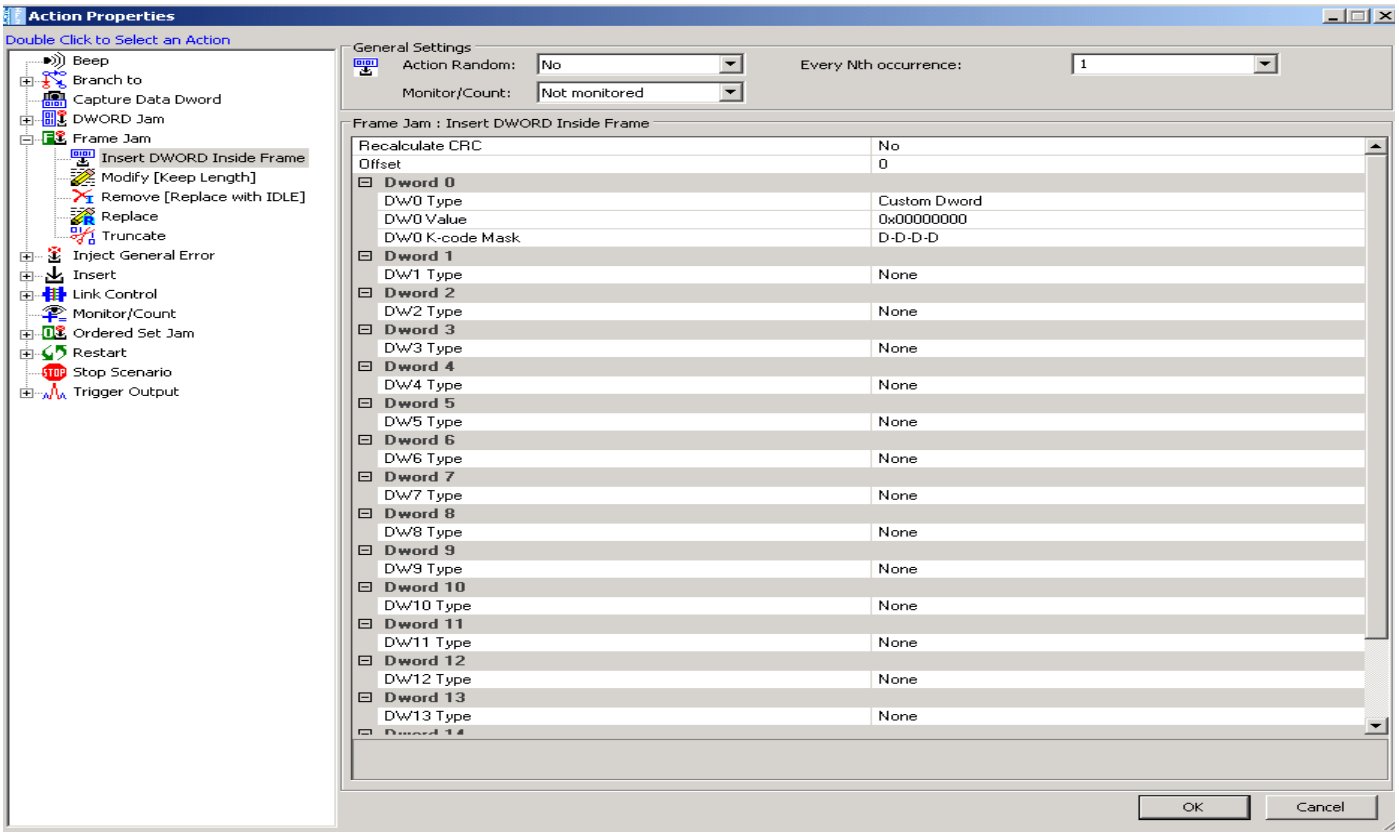


Figure 4.28: Example 2: Adding Action Insert DWORD Inside Frame for State 0

17. Click the **OK** button to close the Action Properties dialog box.
18. To add another Action, click on the link **<Click here to add another action>**. The Action Properties dialog box appears.
19. In this example, you enter the Action **Beep**, and you set the duration of the beep for 50 ms.
20. Add another Action to stop the Scenario.

21. Click **OK** to close the Action Properties dialog box. See the following screen capture.

Figure 4.29: Example 2: Complete Scenario of Insert DWORD in Advanced Mode

Example 3: Using Timers

This section gives you a sample describing the use of Timers. In this example the Global Rules portion of the Scenario waits for an Ordered Set, Frame Delimiters from P1/P3. Each time the device detects an Ordered Set, Frame Delimiters it injects an Invalid 10-bit Code Error into the traffic stream. This state continues for a random period of time, not to exceed 1.790 seconds. After the time period has elapsed (i.e., the timer times out), the Scenario stops.

Although this example sets the timer for a random period, you also can set the timer for known values (2 ms., 5 mins., 1 hr., and so on).

1. Click the **New Scenario** button in the main library or one of the device libraries. In the Scenario Properties dialog, enter the Scenario name, description, and direction of traffic change.
2. As in previous examples, configure the first Event and its response in the Global Rules area. Choose Ordered Set, Frame Delimiters as the Event and **Inject** an Invalid 10-bit Code Error as the Action.

3. Click the prompt to **add another event** (keep in mind this is not a Combined Event).

   The Event Properties dialog box displays.
4. In the Type column on the left, choose **Timer**. Set the timer for random timing with a maximum time limit of 1.790 seconds.
5. Click **OK** to close the Event Properties dialog box.
6. Click the prompt to **add an action** to correspond with the second Event.

   The Action Properties dialog box appears.
7. In the Type list on the left, choose **Stop Scenario** as the Action that you want after the timer has expired.
8. Click **OK** to close the Action Properties dialog box.

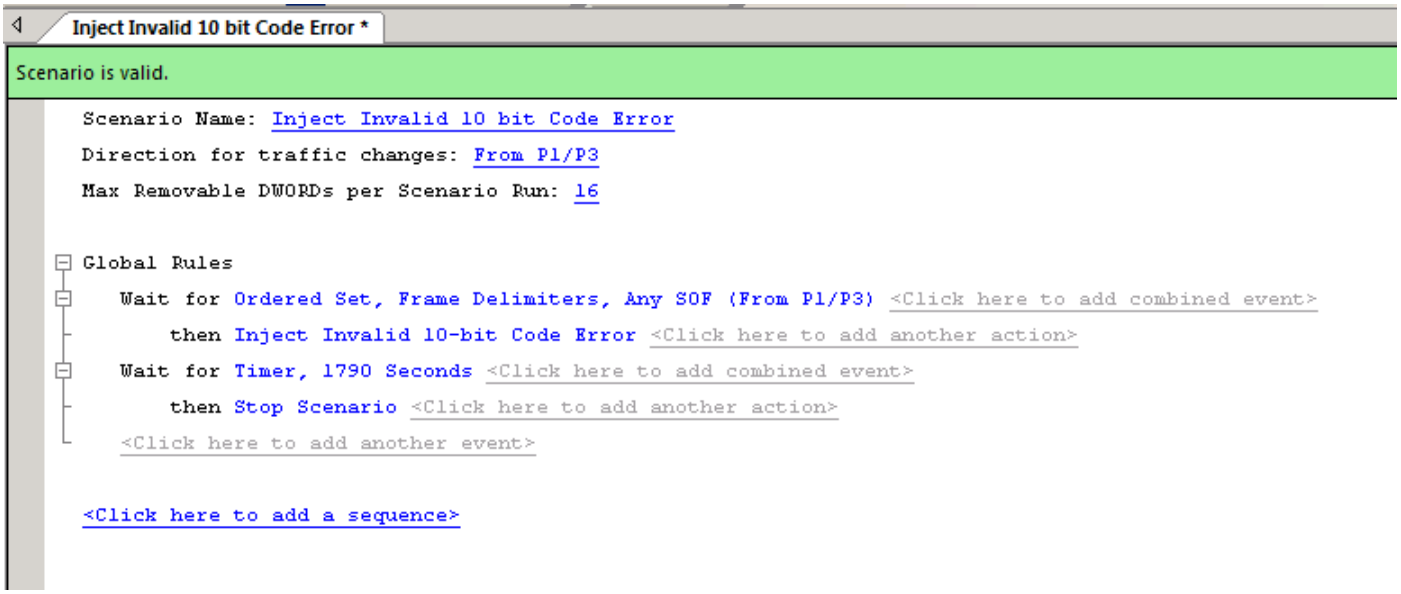


Figure 4.30: Example 3: Setting the Timer

9. In the File menu, select **Save Scenario** to save the Scenario.

Sequence Creation

A sequence can have multiple states, but only one state is active at any time. In other words, at any point in time, a sequence “waits” for one Event (or Combined Event) and responds with the corresponding Action or set of Actions when the Event occurs.

A sequence is more powerful than Global Rules, because you can create branching or looping test logic with a sequence.You can include up to two sequences in a Scenario, but each is completely independent of the other. There is no branching or other interaction between the two, except through the Restart All Sequences Action.

You must follow some simple rules when creating sequences:

TABLE 4.6: Sequence Rules

You can use only two branch Actions per state. When you specify Actions for a state, you can only use two instances of **Branch to an Existing State** or **Branch to a New State**. If you try to use more than two, a red error message appears in the status area of the application that says “Too Many Actions.”
You can use only one restart sequence Action per state. When you specify Actions for a state, you can only use one instance of **Restart Current Sequence** or **Restart All Sequences**. If you try to use more than one, a red error message appears in the status area of the application that says “Too Many Actions.”
You can use a maximum of 255 states per sequence. If you try to use more than 255 states, a red error message appears in the status area of the application.

Summary of Scenario Creation

The suggested process of creating and executing a Scenario is as follows:

1. Create a Scenario in the main library.
2. In Simple Mode, click on the links to specify an Arm Event (optional), a Jam Event and Jam Actions.
3. In Advanced Mode, click on the links to create Global Rules Events and Actions and/or to create Sequence and State Events and Actions.
4. Complete the Scenario and Save it.
5. Select the Scenario in the File Library that you want to run on the device.
6. To run the Scenario, click the **Start Scenario** button. The device starts to monitor/modify traffic.

Running Scenarios

If you use a general library as a Scenario archive, then the process of executing a Scenario is as follows:

1. In the Teledyne LeCroy FC InFusion application the Port Assignment window displays in the application window. This Port Assignment panel displays the Serial Number of the device it is connected to, the Ports and their Function, the Library and Scenario.

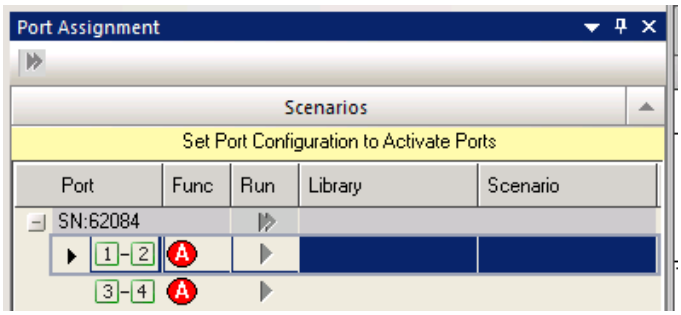


Figure 4.31: Port Assignment Panel

2. Click on **File > Open** to open an existing File Library. The File Library displays all saved Scenarios in that library

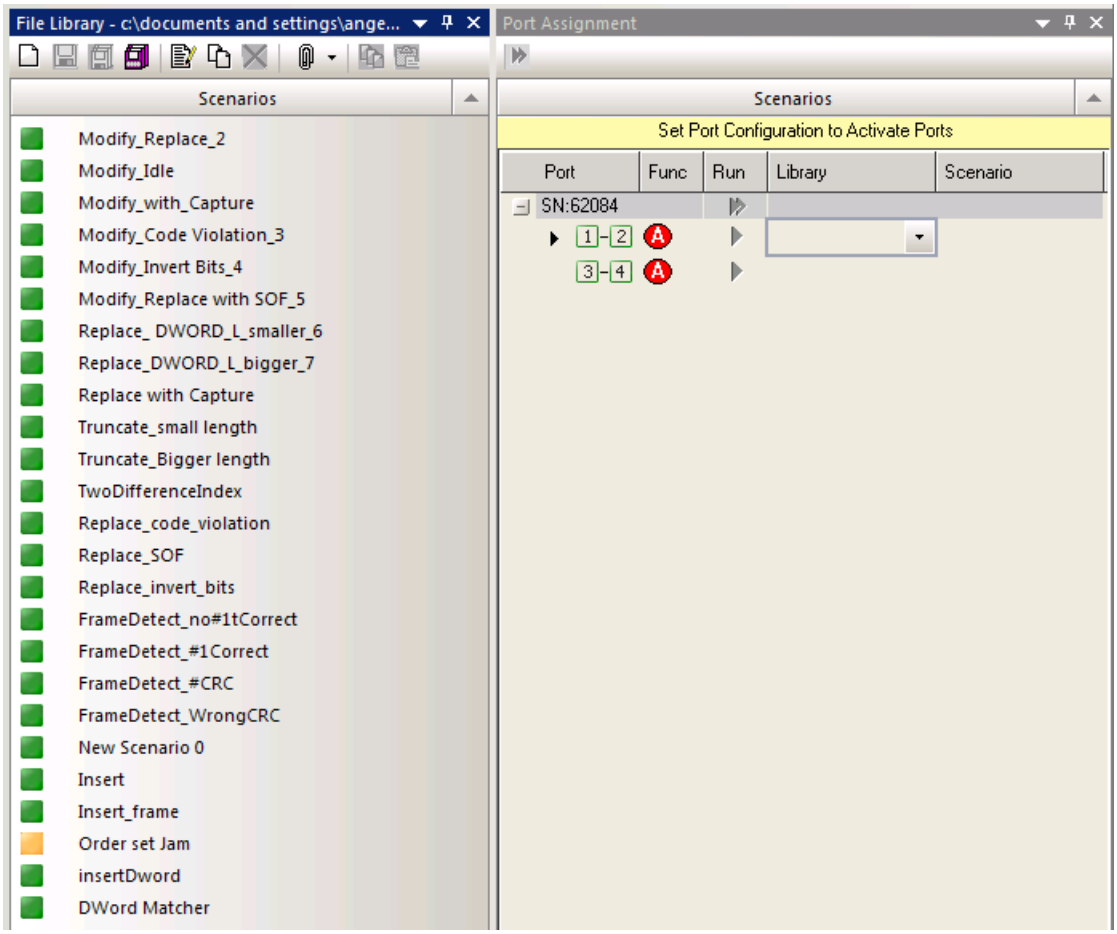


Figure 4.32: Open Existing File Library

3. Double-click a Scenario from the File Library to open the Scenario window. Changes to the Scenario can be made and saved from this window.

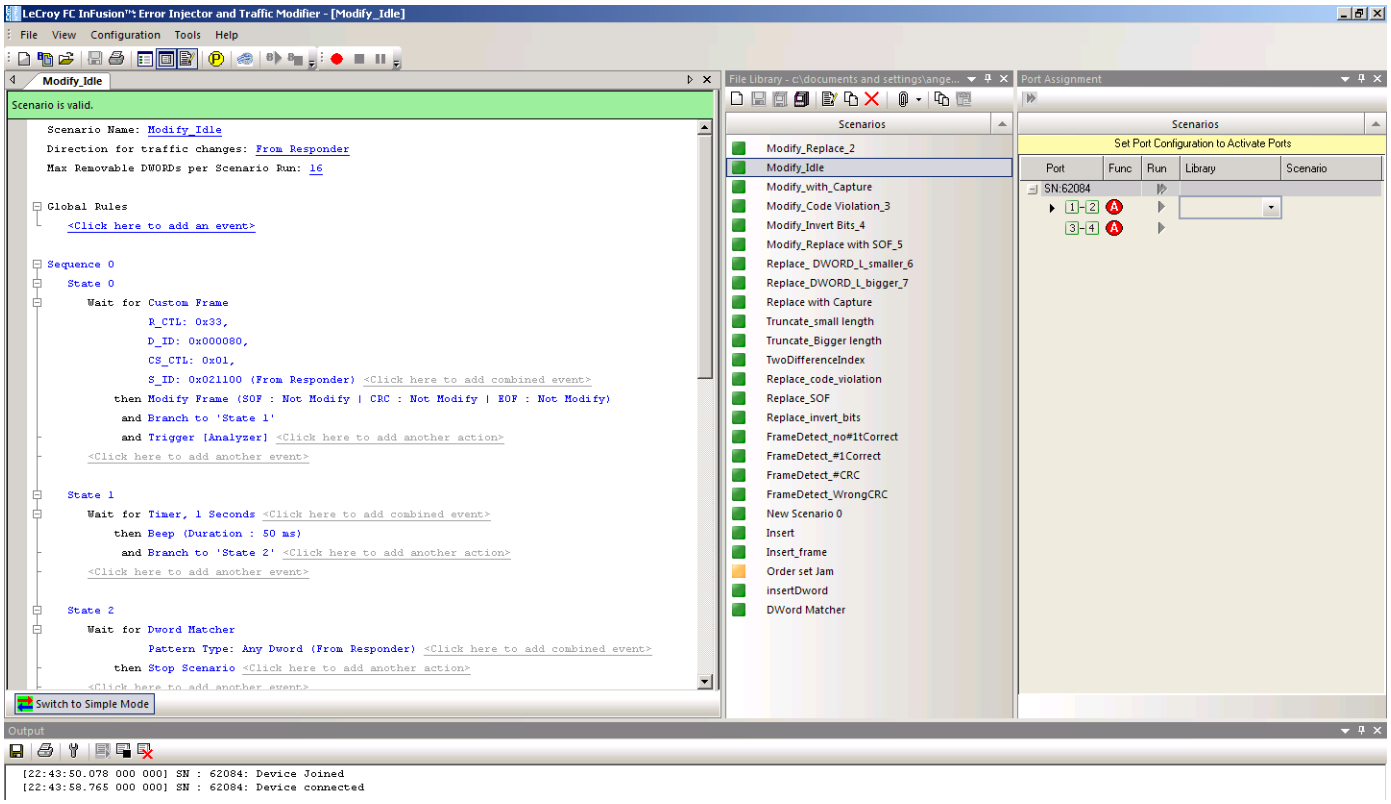


Figure 4.33: Running an Existing Scenario

4. Select the **Library** for Ports 1 and 2 from the drop-down list in the Port Assignment panel.

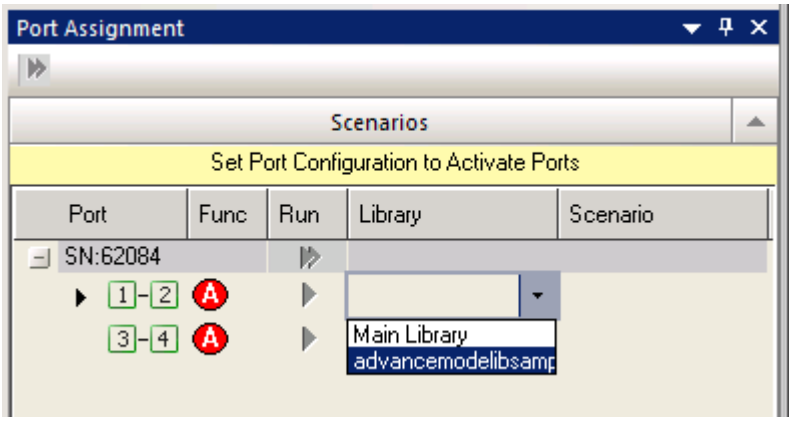


Figure 4.34: Selecting a Library in the Port Assignment Panel

5. Select the **Scenario** for Ports 1 and 2 from the drop-down list in the Port Assignment panel.

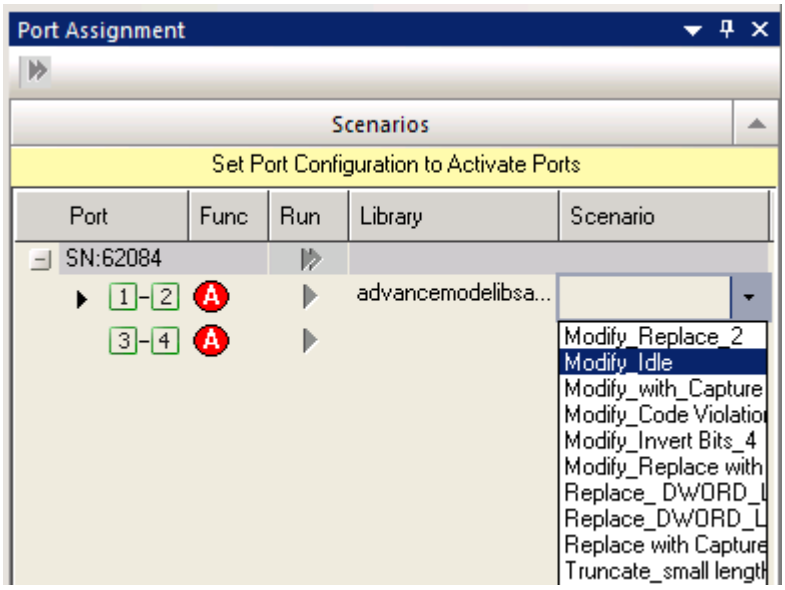


Figure 4.35: Selecting a Scenario in the Port Assignment Panel

6. Repeat steps 4 and 5 to select Library and Scenario for Ports 3 and 4.

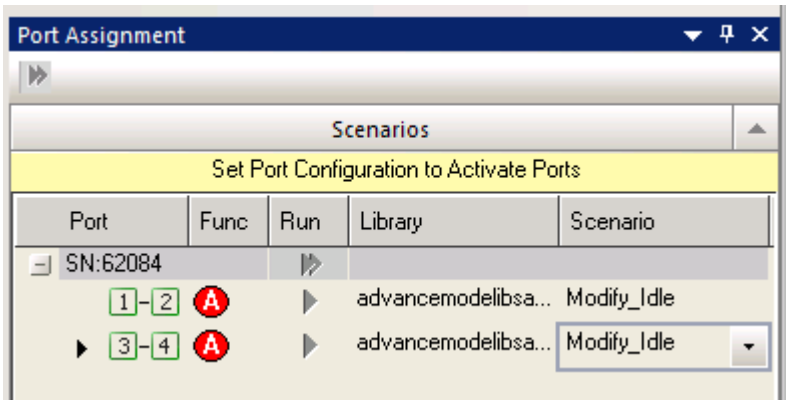


Figure 4.36: Library and Scenario Selected for All Ports

7. Click on the **Configuration > Port Configuration** or **Set Port Configuration** icon, if you need to configure ports on the device. Click OK.

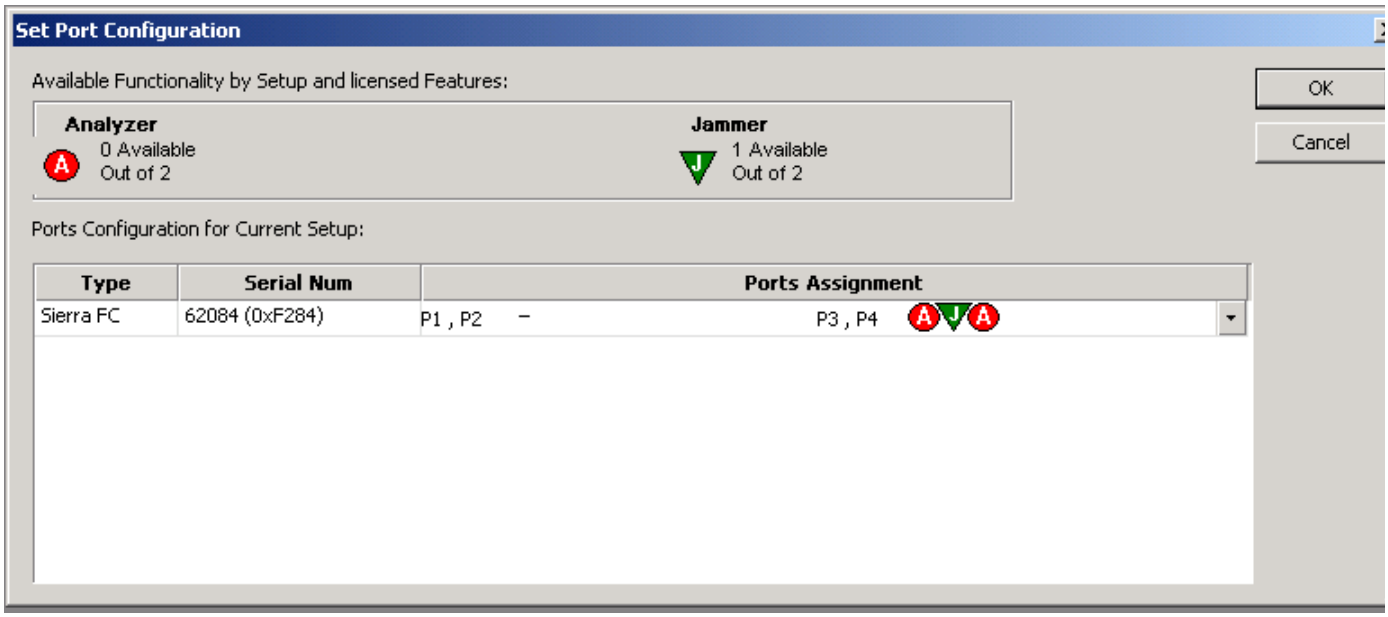


Figure 4.37: Setting Port Configuration

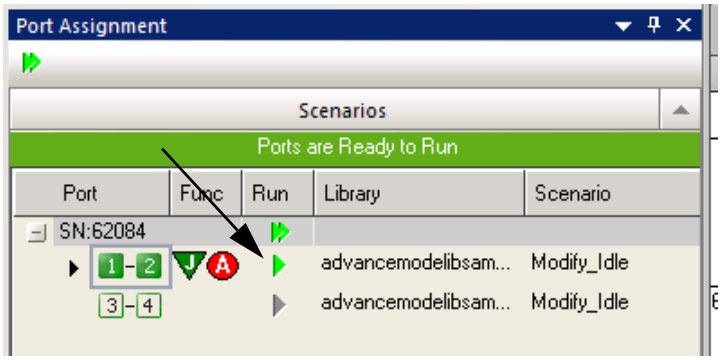


Figure 4.38: Ports 1 and 2 Configured

8. Once the ports are set the Port Assignment window will display ‘Ports are Ready to Run’. Click the green arrow to run the Scenario (see Figure 4.38 on page 322). Click the black button to stop running the Scenario.

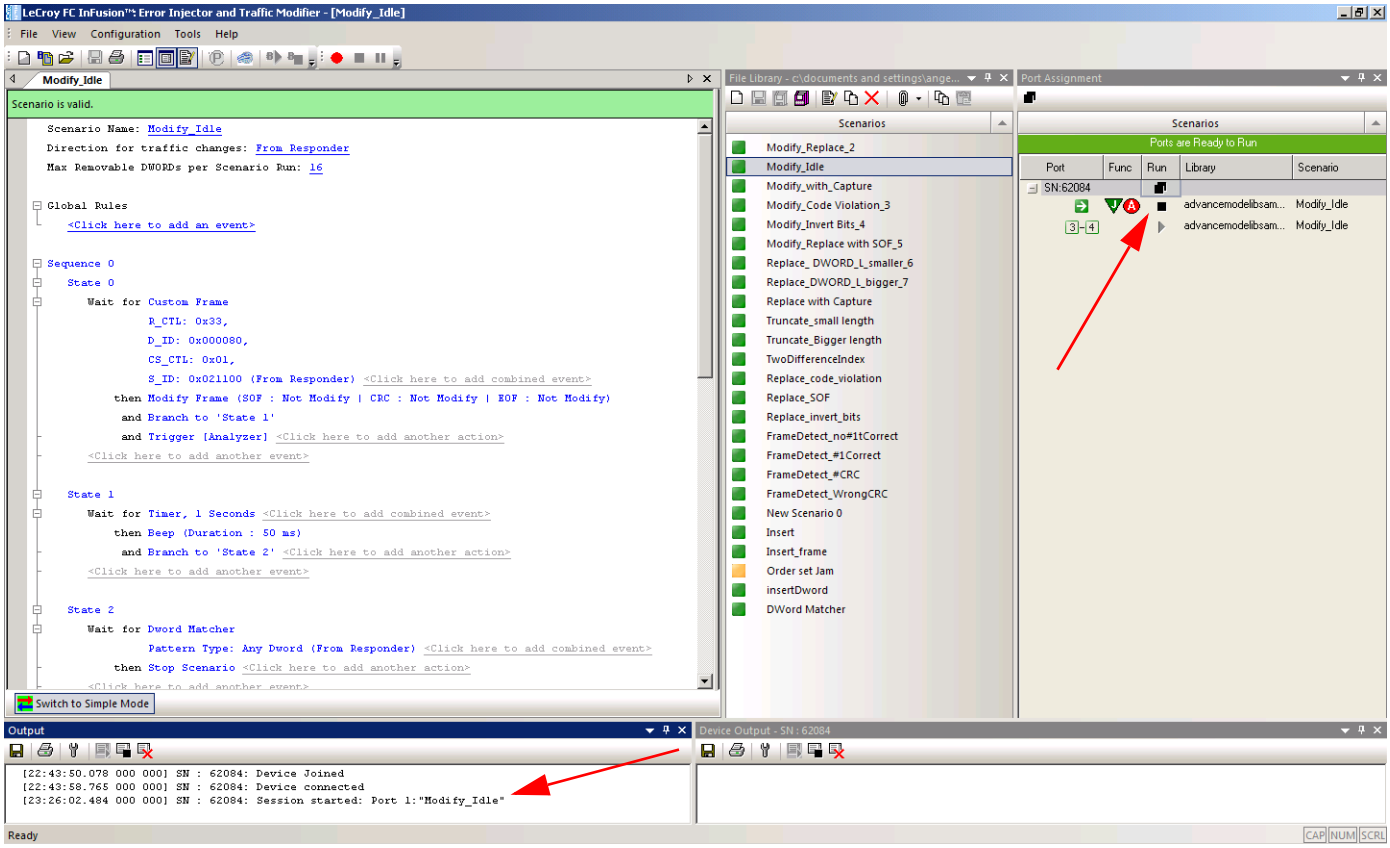


Figure 4.39: Modify_Idle Scenario Running

9. Once the Scenario is complete or stopped the Output panel will display it. The Output Panel displays the Time, Device Serial Number, and the ports on which the Session started, completed and/or stopped (see the following screen capture).

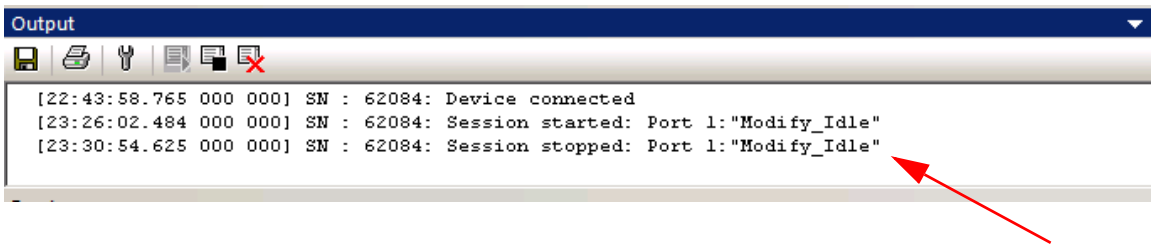

Output
[22:43:58.765 000 000] SN : 62084: Device connected
[23:26:02.484 000 000] SN : 62084: Session started: Port 1:"Modify_Idle"
[23:30:54.625 000 000] SN : 62084: Session stopped: Port 1:"Modify_Idle"

Figure 4.40: Output Panel Displaying Session Started and Stopped

Scenario Batch Files

You can write a script with commands to run a sequence of executable Scenarios automatically. A Scenario Batch file is a text file with a list of commands to run in sequence when you execute the file. A batch script can manage Scenarios and their assigned ports and hardware in sequence, using conditions. The system checks for accuracy of inputs and commands.

Note: Before you run a Scenario Batch file that requests Scenarios, you must download the Scenarios to the Scenarios box.

To start a batch script, click the **New Batch Script** button or select **File > New Batch Script**.

Script Workspace

In the Script Workspace, add a command and make a batch file.

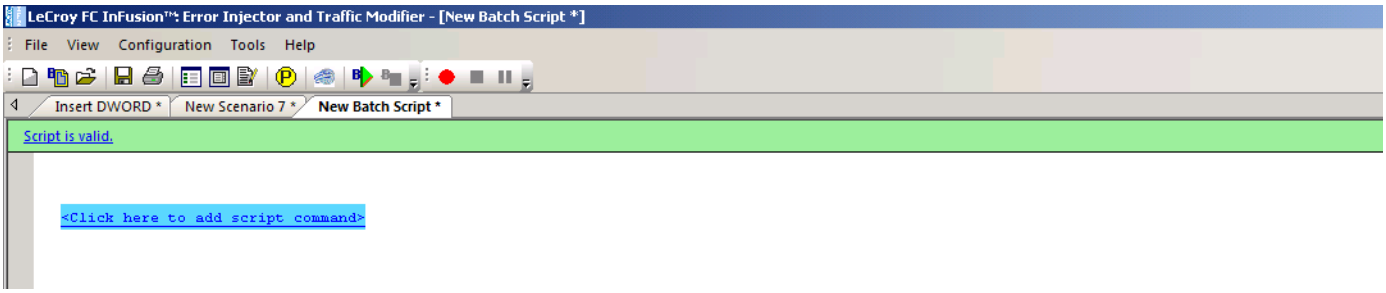


Figure 4.41: Script Workspace

In this window, you can enter a script command by clicking **Click here to add script command**.

1. Click on **<Click here to add script command>** to open the Command Parameters dialog.

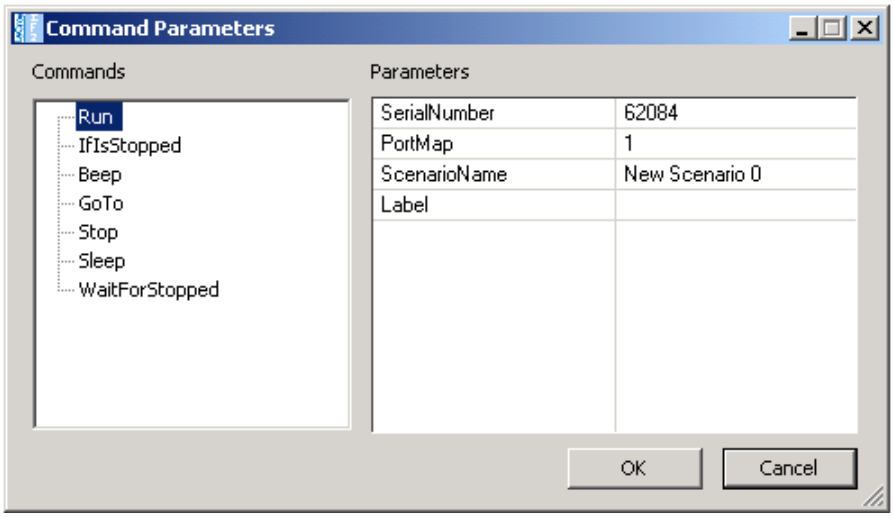
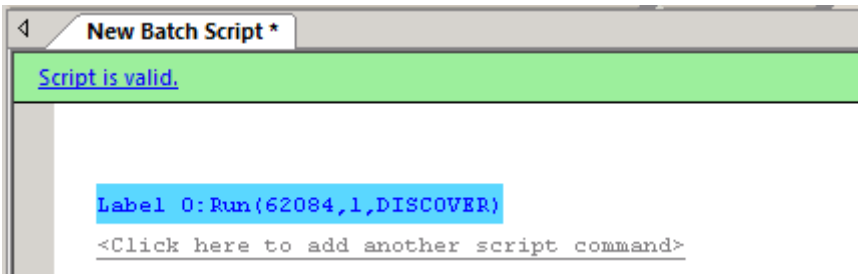


Figure 4.42: Command Parameters

The Command Parameters Dialog contains the list of available commands and their parameters from which to build Scenarios and connected hardware and available ports.

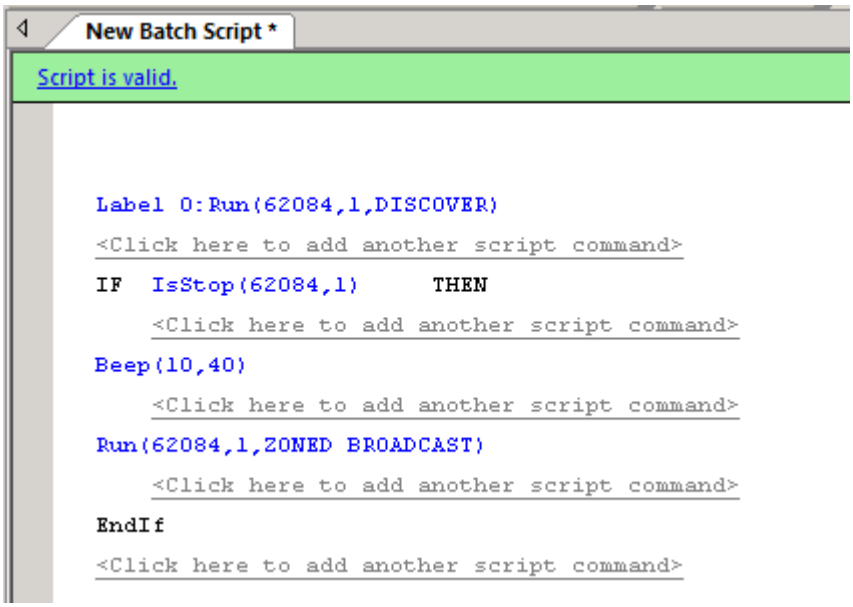
2. Select appropriate parameters for the command and click **OK** to display the script in the Script Workspace.



Note: You can select ports from the port list, depending on number of ports licensed.

Note: The hardware Serial Number may already exist or not. If the Serial Number exists, the Serial Number (for example, S/N: 12871) is shown. In Offline and Simulation mode, you can enter a Serial Number. In Online mode, you can only enter an existing Serial Number.

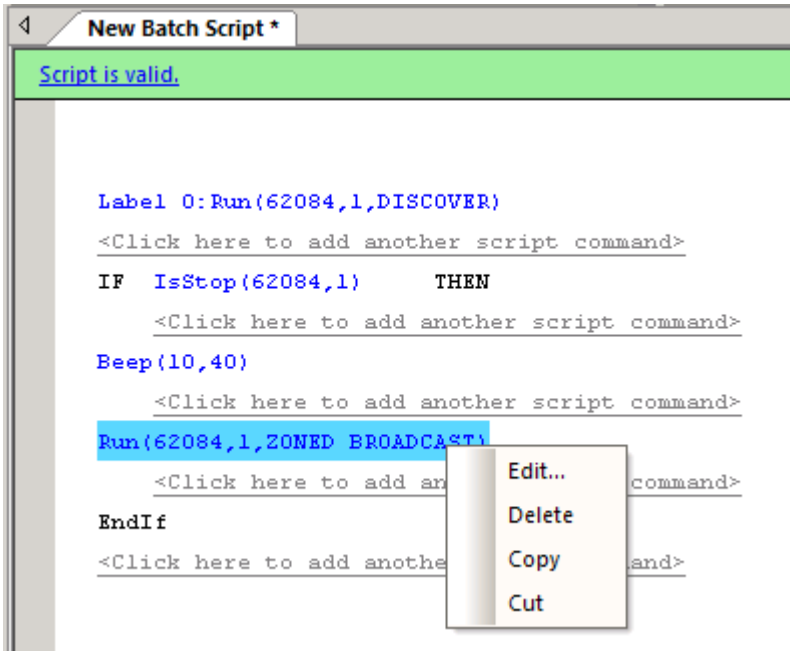
3. To add another command, click **<Click here to add another script command>**.



To copy a script command, right-click on the command and select **Copy**.
Right-click **<Click here to add another script command>** and then select **Paste**.

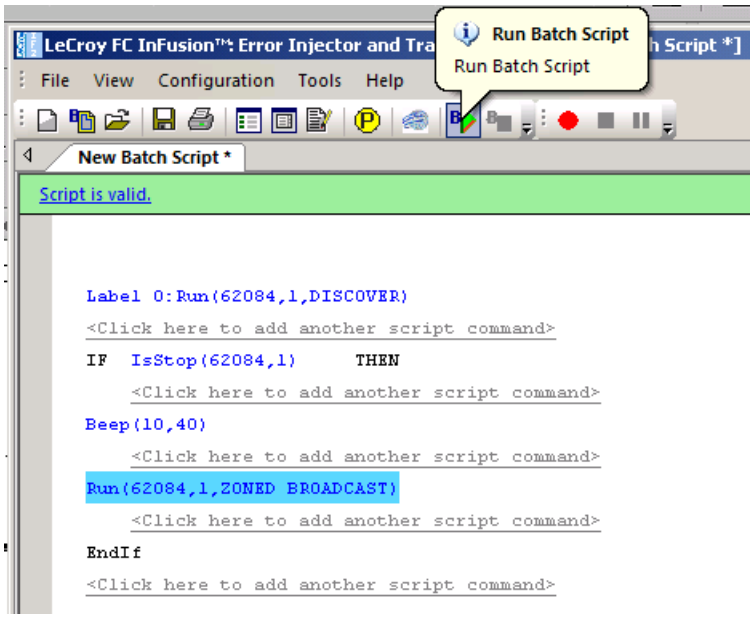
You can also edit, delete, copy and cut a selected script command.

4. To edit batch commands, click the command, or right-click the command and select **Edit** from the popup menu.



5. **To delete a command**, right-click and select **Delete** from the popup menu, or select command and press **Delete** key on keyboard.

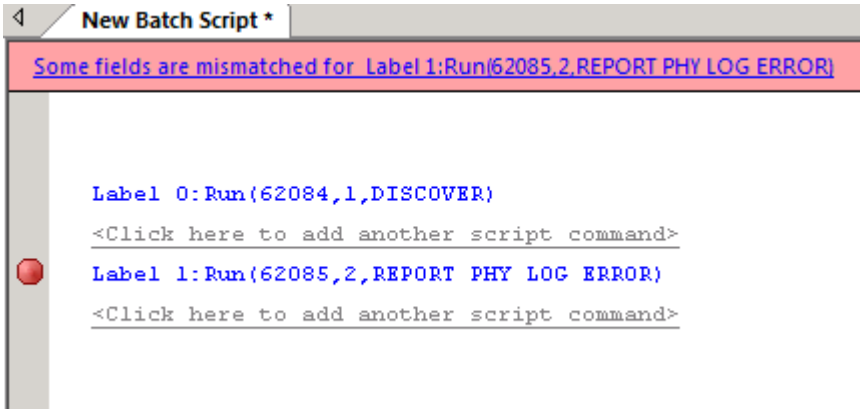
6. After finishing, if everything is correct, push the **Run Batch** button to execute Scenario and save result in the log file.



Note: Before you run a Scenario Batch file that requests Scenarios, you must download the Scenarios to the Scenarios box.

Error Checking

The Script Workspace shows errors in red color. The program reports all errors in the log file. A red circle shows the location of the error. A yellow circle denotes the location of a warning.



Log

Results of executable batch commands are saved automatically into a log file with the user-specified name. The status of executable commands is shown in the log area.

Statements

Statements can be conditional statements or non-conditional statements.

IfIsStopped

Shows whether a Scenario is already stopped or not.

Format

```
IfIsStopped (Serial Number, Responder Port)
```

Parameters

- **Serial Number**: Serial number of hardware
- **PortMap**: Port number in port map

Example

```
IfIsStopped(ox01267, 1) Then
  {
  Beep (750, 300)
  Run (ox01267," Detect AddressFrame Open", 5)
  }
```

Goto Label

Goes to the specified label. Labels can be assigned to each script line.

Format

```
Goto Label3
```

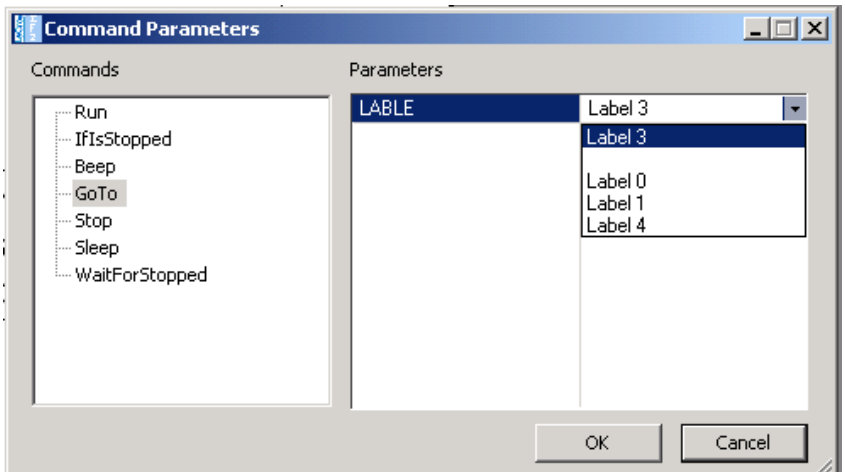
Parameters

none

Example

```
Label3: WaitForStop(0x83456, 2, 100))
Run (ox01267," Inject CRC000", 4)
Goto Label7
```

Note: You can use a **Label** and a **Goto Label** to make loops. First make the label, then make Goto Label. The Command Parameters window shows only enabled Labels.



Run

Runs the Scenario on hardware on specified ports. If you call this command for the first time and the Scenario was not assigned to the hardware and ports before, the Scenario is assigned to specified hardware and ports and then Scenario runs on the hardware.

Format

```
Run(Serial Number, Scenario Name, Responder Port)
```

Parameters

- **Serial Number**: Serial number of hardware
- **Scenario Name**: Name of Scenario
- **PortMap**: Port number in port map

Example

```
Run (ox841200," Substitute address frame", 4)
Beep(800, 400)
Run (ox841200," CRC Inject _ Play CD", 8)
WaitForStop(0x63463, 1, 150)
Run (ox841200," Remove Send Cue Sheet", 2)
Goto Label6
Run (S/N: 12871, Port 1, DISCOVER)
```

Note: If the selected ports are busy, Scenario cannot run, and the command will be skipped. The result will be written in the Log area.

Stop

Stops running the Scenario by hardware and port name.

Format

```
Stop (Serial Number, Responder Port)
```

Parameters

- **Serial Number**: Serial number of hardware
- **PortMap**: Port number in port map

Example

```
Run (ox00820,"Inject CRC000", 2)
Beep(700, 500)
Stop (ox00820, 2)
Goto Label3
...
Label3 : Run(ox005007,"Detect DATA", 8)
Sleep(40)
```

WaitForStop

Used to wait for the occurrence of a specified condition.

Format

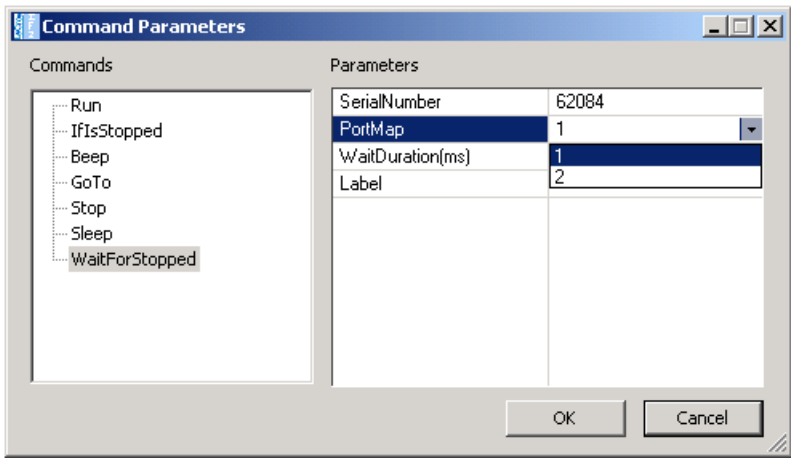
```
WaitForStop(SerialNumber, Responder Port, Duration)
```

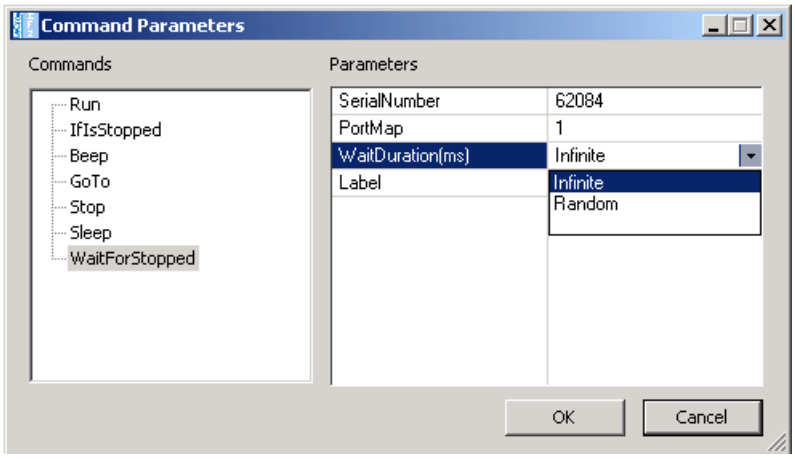
Parameters

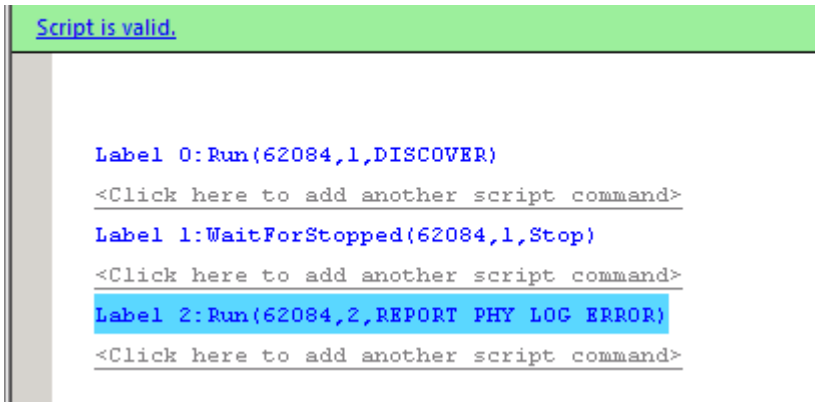
- **Serial Number**: Serial number of hardware
- **PortMap**: Port number in port map
- **Duration**: Integer or random duration in milliseconds. In the Command Parameters Window, WaitForStop duration has three options:
  - **Infinite**: Wait until **Stop** command.
  - **Random**: Stop after a random time.

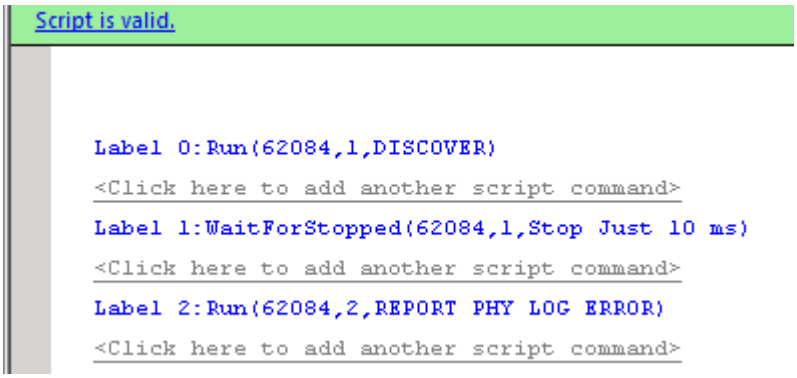
Example

```
Run (ox001267,"Detect AddressFrame Open", 2)
WaitForStop (0x348790, 2, Forever)
Run (ox005007,"Detect DATA", 4)
WaitForStop(ox005007, 4, 100)
Stop (ox001267, 2)
```









Sleep

Used to sleep for a few seconds.

Format

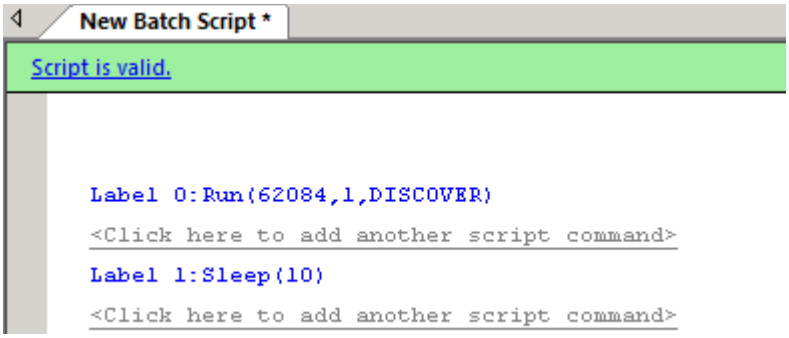
```
Sleep(Duration)
```

Parameters

- **Duration**: Integer or random duration in milliseconds

Examples

```
Sleep(100)
```



Beep

If specified condition is satisfied, the system beeps for the specified duration.

Format

```
Beep (Duration, Frequency)
```

Parameters

- **Duration**: Integer or random duration in milliseconds
- **Frequency**: Frequency in hertz

Example

```
IfIsStopped(0x83456, 4)) then
  {
  Beep (2, 20)
  Run (0x83456,"Identify_Disparity error", 8)
  }
```

Appendix A

China Restriction of Hazardous Substances Table

The following tables are supplied in compliance with China's Restriction of Hazardous Substances (China RoHS) requirements:

	有毒有害物质和元素					
部件名称	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCBAs	X	O	X	X	X	X
机械硬件	O	O	X	O	O	O
金属片	O	O	X	O	O	O
塑料部件	O	O	O	O	X	X
电源	X	X	X	O	X	X
电源线	X	O	X	O	X	X
保护外壳(如有)	O	O	O	O	X	X
电缆组件(如有)	X	O	X	O	X	X
风扇(如有)	X	O	X	O	X	X
交流滤波器和熔丝组件(如有)	X	O	X	O	O	O
外部电源(如有)	X	X	X	O	X	X
探头(如有)	X	O	X	O	X	X
O: 表明该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求之下。						
X: 表明该有毒有害物质至少在该部件的某一均质材料中的含量超过 SJ/T11363-2006 标准规定的限量要求。						

EFUP (对环境友好的使用时间) 使用条件:
温度: 5摄氏度到40摄氏度
湿度: 5% - 95%最大相对湿度 (无冷凝)
高度: 最高2000米

	Toxic or Hazardous Substances and Elements					
Part Name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr^{6+})	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCBAs	X	O	X	X	X	X
Mechanical Hardware	O	O	X	O	O	O
Sheet Metal	O	O	X	O	O	O
Plastic Parts	O	O	O	O	X	X
Power Supply	X	X	X	O	X	X
Power Cord	X	O	X	O	X	X
Protective Case (if present)	O	O	O	O	X	X
Cable Assemblies (if present)	X	O	X	O	X	X
Fans (if present)	X	O	X	O	X	X
AC Filter/Fuse Assy (if present)	X	O	X	O	O	O
Ext Power Supply (if present)	X	X	X	O	X	X
Probes (if present)	X	O	X	O	X	X
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement specified in SJ/T11363-2006.						
X: Indicates that this toxic or hazardous substance contained in at least one of the homogenous materials used for this part is above the limit requirement specified in SJ/T11363-2006.						

EFUP (Environmental Friendly Use Period) Use Conditions:

Temperature	5C to 40C
Humidity	5% to 95% max RH (non-condensing)
Altitude	Up to 2000 meters

Appendix B

How to Contact Teledyne LeCroy

Type of Service	Contact	
Call for technical support	US and Canada:	1 (800) 909-7112
	Worldwide:	1 (408) 653-1260
Fax your questions	Worldwide:	1 (408) 727-6622
Write a letter		Teledyne LeCroy Protocol Solutions Group Customer Support 3385 Scott Blvd. Santa Clara, CA 95054-3115 USA
Send e-mail		psgsupport@lecroy.com
Visit Teledyne LeCroy's web site		teledynlecroy.com/

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